APPENDIX VII

ACUTE TOXICITY TEST RESULTS

Volume II

Evaluation of the Effects of AFFF Inputs on the VIP Biological Nutrient Removal Process and Pass-Through Toxicity

PHASE 1A

Submitted to:

Naval Research Laboratory

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Civil and Environmental Engineering Department
Old Dominion University
October 1997

Project No. N00014-96-1-G021

19971124 072

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-018

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE October, 1997	3. REPORT TYPE AND DATES COVERED Phase IA Study, Sept. 1996 - Sept 1997
4. TITLE AND SUBTITLE Evaluation of the Effects of AFFF Inputs to the VIP Biological Nutrient Removal Process and Pass-through Toxicity Vol. II		5. FUNDING NUMBERS Grant No: N00014-96-1-G021 PR-Number: 61-2330-96 Disburing Code: N68342 AGO Code: N66020 CAGE Code: 50075
6. AUTHOR(S) Mujde Erten-Unal Gary C. Schafran		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(S) Old Dominion University Department of Civil & Environmental Eng. KH 135, Norfolk, VA. 23529-0241		8. PERFORMING ORGANIZATION REPORT NUMBER Project Number: 270351
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(S) Naval Research Laboratory 4555 Overlook Avenue, SW Washington DC 20375-5326		10. SPONSORING/MONITORING AGENCY REPORT NUMBER
11. SUPPLEMENTARY NOTES		
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for Public Release		12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

This report discusses the results of a bench scale study conducted to evaluate the potential inhibitory effects of untreated AFFF wastewater to the Virginia Initiative Plant (VIP) biological nutrient removal process. A bench-scale study was conducted to evaluate the potential inhibitory effects of untreated AFFF wastewater to the nitrification process of the Virginia Initiative Plant biological nutrient removal system. Under this testing, bench-scale reactors simulating the nitrification process were loaded at various AFFF concentrations and the influence on the process performance was evaluated. The purpose of this effort was to determine the level of AFFF that could be incorporated into the influent of a biological nutrient removal process without causing inhibitory effects. The results of the nitrification inhibition study showed that the AFFF concentrations tested in the range between 10 ppm to 60 ppm did not show any significant inhibition to biological nitrification. The effluent from each reactor did not exhibit any pass-through toxicity as well.

14. SUBJECT TERMS			15. NUMBER OF PAGES 185
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18
298-102

APPENDIX VII

ACUTE TOXICITY TEST RESULTS

ACUTE TOXICITY TEST RESULTS

10 ppm AFFF

MARCH 11, 1997

March 21, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-080
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 636
Sample ID: A-1
JRA ID: 97-2726

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Claiborne
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-1 JRA #: 97-2726

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:25
Test End:	3/14/97	16:32

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.59 - 8.05	7.65 - 8.31
	Adjusted	N/A	

JRA #: 97-2726 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.3 - 9.1	7.3 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2726 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/13/97		
	Result (mg/L)	0.09		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-1 JRA #: 97-2726

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:20
Test End:	3/14/97	17:05

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.58 - 8.03	7.69 - 8.31
	Adjusted	N/A	

JRA #: 97-2726 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.4 - 9.1	7.7 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA # 97-2726 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/17/97		
Result (mg/L)		33		
QC Range (mg/L)		1	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

A-1

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		

PWC# 636

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility Dept. Civil & Environ. Eng. ODU
Address ODU. Norfolk. VA

County _____ Pipe/Outfall/Location _____
NPDES# A-1. 8 Hr. Instream Waste Conc _____
Sample collected by (print&sign) H. YANG Affiliation _____
Type of sample ✓ (Grab): Date 03/11/97 Time 9 PM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number A-1. 8Hr. Frequency of collection _____ Volume 2L

*Temperature of sample in sample collection device 24.0°C
Final temperature of effluent at sample collection point _____
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? No. dechlorinated? No. If so, how? _____
Permit with interim chlorine limit? No. If yes – limit (mg/L) _____
Field pH 7.41 Field Total Residual Chlorine _____
Comments/Sample description _____

Type of test(s) to be performed _____
(Specify organisms) _____
Method of shipment Reed

Print & Sign Names

1/ Relinquished by H. YANG Date 3-11-97 Time 9 p.m
Received by Keith Cuffel Date 3-12-97 Time 0900
2. Relinquished by Keith Cuffel Date 3-12-97 Time 0915 #636
Received by Arthur Miller Date 3/12/97 Time 0920
See PWC C-O-C

FOR REED LAB USE ONLY

JRA# 97-2726 Arrival Temperature 1.8°C On ice? yes
Color light orange Odor earthy Solids none
pH 7.88 DO (mg/L) 9.0 Conductivity (µmhos/cm) 1800 @ 20.1 °C
Salinity (ppt) 1 TRC (mg/L) — Method —

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-2726

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - ODU OUTFALL: A-1 3

ORGANISM SOURCE: ABS JRA BATCH#: C204 HATCH DATE: 3/8/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%) 0	24	48			pH (Day 0: 6.0 - 9.0) 0	24	48			DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C) 0	24	48					TEMPERATURE (19 - 21°C) 0	24	48			SALINITY (19 - 21ppt) 0	END
HOURS⇒																									
0	A	10	10	10			8.31	8.16	7.69			7.9	7.8	7.7					19.8	19.7	20.0			20	20
100	B	10	10	10																					
6.25	A	10	10	9			8.29	8.14	7.61			8.0	7.9	7.7					19.9	19.7	20.0			20	20
90	B	10	10	10																					
12.5	A	10	10	10			8.28	8.12	7.61			8.1	7.9	7.6					19.9	19.7	20.0			20	20
100	B	10	10	10																					
25	A	10	10	10			8.26	8.08	7.61			8.3	8.0	7.6					20.0	19.7	20.0			20	20
100	B	10	10	10																					
50	A	10	10	10			8.21	8.03	7.60			8.4	8.1	7.5					19.9	19.7	20.0			20	20
95	B	10	10	9																					
100	A	10	10	10			8.03	8.00	7.58			9.1	8.2	7.4					19.7	19.7	20.0			20	20
100	B	10	10	10																					
INIT		DS	DS	DS																					
DATE 1997		3/12	3/13	3/14																					
TIME		1720	1653	1705																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-2724

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - Ohu OUTFALL: A1 3

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M451 HATCH DATE: 3/11-12/97 1500-0800

Conc. (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.20	7.65			7.9	7.6	7.3					19.8	19.1	19.4			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.29	8.17	7.62			8.0	7.6	7.2					19.9	19.1	19.4			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.28	8.17	7.62			8.1	7.7	7.3					19.9	19.1	19.4			20	20
100	B	10	10	10																					
25	A	10	10	10			8.26	8.15	7.61			8.3	7.6	7.4					20.0	19.1	19.4			20	20
100	B	10	10	10																					
50	A	10	10	10			8.21	8.13	7.60			8.4	7.6	7.3					19.9	19.1	19.4			20	20
85	B	10	7	7																					
100	A	10	10	10			8.03	8.05	7.59			9.1	7.7	7.3					19.7	19.1	19.4			20	20
100	B	10	10	10																					

INIT	DSD	LDG	DSD		
DATE 1997	3/12	3/13	3/14		
TIME	1725	1730	1632		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C variegatus " "

GENERAL COMMENTS

JRA# 97-2726

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: A-1 3

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/12/97	0	3/11/97 2100	3/12/97	19.7	8.03	/	9.1	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	Date (1997)	3/12	3/13	3/13	3/14			
Method	Method	Method	Time	1825	0953	1817	1030			
Minutes	Amount	Amount	Init	DSB	LOG	LOG	DSB			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/12/97	0	3/12/97	19.8	8.31	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	D/UTR to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250mL TYPE: Polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	2026
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	~~Baxter~~ VWR	digi-thermo	~~1046303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

March 21, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-080
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 637
Sample ID: A-2
JRA ID: 97-2727

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Claiborne
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-2 JRA #: 97-2727

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:25
Test End:	3/14/97	16:34

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.61 - 8.05	7.65 - 8.31
	Adjusted	N/A	

JRA #: 97-2727 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.1 - 9.0	7.3 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2727 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/13/97		
Result (mg/L)		0.09		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-2 JRA #: 97-2727

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:20
Test End:	3/14/97	17:02

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.55 - 7.98	7.69 - 8.31
	Adjusted	N/A	

JRA #: 97-2727 Test Type&Organism: Acute (*Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.4 - 9.0	7.7 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2727 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/17/97		
	Result (mg/L)	33		
	QC Range (mg/L)	1	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

A-2

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		

PWC# 637

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility Dept. Civil & Environ. Eng. ODU.
Address ODU. Norfolk, VA.

County _____ Pipe/Outfall/Location _____
NPDES# A-2 8 Hr. Instream Waste Conc _____
Sample collected by (print&sign) H. YANG Affiliation _____
Type of sample ✓ (Grab): Date 03/11/97 Time 9PM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number A-2, 8Hr. Frequency of collection _____ Volume 2L.
*Temperature of sample in sample collection device 24.0°C
Final temperature of effluent at sample collection point _____
*Is sample collection device chilled? No Is sample packed on ice for shipment? _____
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? No. dechlorinated? No. If so, how? _____
Permit with interim chlorine limit? No. If yes – limit (mg/L) _____
Field pH 7.51 Field Total Residual Chlorine _____
Comments/Sample description _____

Type of test(s) to be performed _____
(Specify organisms) _____
Method of shipment Reed

Print & Sign Names

1. Relinquished by H. YANG Date 03/11/97 Time 9 PM #637 ~~A-2~~ ass
   Received by Keith [illegible] Date 3-12-97 Time 0900
2. Relinquished by Keith [illegible] Date 3-12-97 Time 0915
   Received by Althea Miller Date 3/12/97 Time 0920
   See PWC C-O-C

FOR REED LAB USE ONLY

JRA# 97-2727 Arrival Temperature 1.8°C. On ice? yes
Color tan Odor earthy Solids none
pH 8.08 DO (mg/L) 9.7 Conductivity (µmhos/cm) 1800 @ 17.8 °C
Salinity (ppt) 1 TRC (mg/L) – Method –

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-2727

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - ODU OUTFALL: A-2 4

ORGANISM SOURCE: ABS JRA BATCH#: C204 HATCH DATE: 3/8/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.16	7.69			7.9	7.8	7.7					19.8	19.7	20.0			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.32	8.16	7.59			8.0	7.9	7.8					19.8	19.7	20.0			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.30	8.14	7.61			8.2	7.9	7.7					19.8	19.7	20.0			20	20
100	B	10	10	10																					
25	A	10	10	10			8.28	8.12	7.61			8.3	8.0	7.8					19.8	19.7	20.0			20	20
95	B	10	10	9																					
50	A	10	9	9			8.19	8.04	7.59			8.4	8.2	7.4					19.9	19.7	20.0			20	20
95	B	10	10	10																					
100	A	10	10	10			7.97	7.88	7.55			9.0	8.1	7.4					19.7	19.7	20.0			20	20
100	B	10	10	10																					

INIT		DSJ	DSJ	DSJ	
DATE 1997		3/12	3/13	3/14	
TIME		1720	1655	1702	

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-2727

REED & ASSOCIATES

NPDES#: N/A CLIENT: Corona - OCU OUTFALL: A-2 4

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M451 HATCH DATE: 3/11-12/97 1500-0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.20	7.66			7.9	7.6	7.3					19.8	19.1	19.4			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.32	8.18	7.64			8.0	7.5	7.3					19.8	19.1	19.4			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.30	8.17	7.64			8.2	7.5	7.3					19.8	19.1	19.4			20	20
100	B	10	10	10																					
25	A	10	10	10			8.28	8.15	7.63			8.3	7.6	7.2					19.8	19.1	19.4			20	20
100	B	10	10	10																					
50	A	10	9	9			8.19	8.13	7.63			8.4	7.6	7.2					19.9	19.1	19.4			20	20
90	B	10	9	9																					
100	A	10	9	9			7.97	8.05	7.61			9.0	7.6	7.1					19.7	19.1	19.4			20	20
90	B	10	9	9																					

INIT		BJ	LDG	BJ	
DATE 1997		3/12	3/13	3/14	
TIME		1725	1740	1634	

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" *C variegatus* " "

GENERAL COMMENTS

JRA# 97-2727

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: A-2

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)												
DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/12/97	0	3/11/97 2100	3/12/97	19.7	7.97	/	9.0	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date				Date (1997)	3/12	3/13	3/13	3/14
Method				Time	1825	0953	1817	1030
Minutes	Date	Date	Date	Init	DSJ	LOG	LOG	DSJ
	Method	Method	Method					
	Amount	Amount	Amount					

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/12/97	0	3/12/97	19.8	8.31	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS				
CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	dilute to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0
CALCULATIONS PERFORMED BY: DSJ				

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSJ
NUMBER OF ORGANISMS	DSJ
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSJ

TEST CHAMBER SIZE: 250mL TYPE: Polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	~~RG~~
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	~~Baxter~~ VWR	digi-thermo	~~1046203~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

March 21, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-080
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 638
Sample ID: A-3
JRA ID: 97-2728

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Claiborne
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-3 JRA #: 97-2728

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:25
Test End:	3/14/97	16:35

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.62 - 8.01	7.65 - 8.31
	Adjusted	N/A	

JRA #: 97-2728 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.2 - 9.1	7.3 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2728 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/13/97		
	Result (mg/L)	0.09		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-3 JRA #: 97-2728

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:20
Test End:	3/14/97	16:59

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.56 - 8.04	7.69 - 8.31
	Adjusted	N/A	

JRA #: 97-2728 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.4 - 9.1	7.7 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2728 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/17/97		
Result (mg/L)		33		
QC Range (mg/L)		1	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

A-3

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		

PWC # 638

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility Dept. Civil & Environ. Eng. ODU.
Address ODU. Norfolk, VA.

County _____ Pipe/Outfall/Location _____
NPDES# A-3. 8Hr. Instream Waste Conc _____
Sample collected by (print&sign) H. YANG Affiliation _____
Type of sample ✓ (Grab): Date 03/11/97 Time 9 PM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number A-3. 8Hr Frequency of collection _____ Volume 2L.
*Temperature of sample in sample collection device 24.0°C.
Final temperature of effluent at sample collection point _____
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? No. dechlorinated? No. If so, how? _____
Permit with interim chlorine limit? No If yes – limit (mg/L) _____
Field pH 7.54 Field Total Residual Chlorine _____
Comments/Sample description _____

Type of test(s) to be performed _____
(Specify organisms) _____
Method of shipment Reed

Print & Sign Names

1. Relinquished by H. YANG Date 03/11/97 Time 9 PM
Received by Keith Cutful Date 3-12-97 Time 0900 #638
2. Relinquished by Keith Cutful Date 3-12-97 Time 0915
Received by Althea Miller Date 3/12/97 Time 0920

FOR REED LAB USE ONLY

JRA# 97-2728 Arrival Temperature 1.8°C. On ice? yes
Color light yellow Odor earthy Solids none
pH 7.92 DO (mg/L) 8.6 Conductivity (µmhos/cm) 1800 @ 22.8 °C
Salinity (ppt) 1 TRC (mg/L) — Method —

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-2728

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - ODU OUTFALL: A-3 5

ORGANISM SOURCE: ABS JRA BATCH#: C204 HATCH DATE: 3/8/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.16	7.67			7.9	7.8	7.7					19.8	19.7	20.0			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.30	8.15	7.66			8.1	8.0	7.7					19.8	19.7	20.0			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.28	8.15	7.56			8.2	8.1	7.8					19.9	19.7	20.0			20	20
100	B	10	10	10																					
25	A	10	10	10			8.24	8.14	7.56			8.3	8.1	7.8					19.9	19.7	20.0			20	20
100	B	10	10	10																					
50	A	10	10	10			8.17	8.10	7.56			8.5	8.0	7.6					19.9	19.7	20.0			20	20
100	B	10	10	10																					
100	A	10	10	10			7.98	8.04	7.56			9.1	8.1	7.4					19.7	19.7	20.0			20	20
100	B	10	10	10																					

INIT		DB	DB	DB	
DATE 1997		3/12	3/13	3/14	
TIME		1720	1657	1659	

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-2728

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - Ojul OUTFALL: A-3 5

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M451 HATCH DATE: 3/11-12/97 1500-0800

Conc.(%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.20	7.65			7.9	7.6	7.3					19.8	19.1	19.4			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.30	8.15	7.65			8.1	7.6	7.3					19.8	19.1	19.4			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.28	8.15	7.64			8.2	7.7	7.3					19.9	19.1	19.4			20	20
100	B	10	10	10																					
25	A	10	8	8			8.24	8.14	7.63			8.3	7.6	7.1					19.9	19.1	19.4			20	20
90	B	10	10	10																					
50	A	10	10	10			8.17	8.11	7.62			8.5	7.5	7.2					19.9	19.1	19.4			20	20
100	B	10	10	10	9																				
100	A	10	10	10			7.98	8.01	7.62			9.1	7.5	7.2					19.7	19.1	19.4			20	20
100	B	10	10	10																					

INIT	DST	LDG	DSJ		
DATE 1997	3/12	3/13	3/14		
TIME	1725	1750	1635		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C variegatus " " GENERAL COMMENTS

JRA# 97-2728

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: A-3 5

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)												
DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/12/97	0	3/11/97 2100	3/12/97	19.7	7.98	/	9.1	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

	DO Adj.	pH Adj.	TRC Adj.	Feedings (Mysid)						
Date				1997 Date	3/12	3/13	3/13	3/14		
Method				Time	1825	0953	1817	1030		
Minutes		Amount	Amount	Init	DSJ	LDG	LDG	DSJ		

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/12/97	0	3/12/97	19.8	8.31	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS				
CONC (%) mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (%) mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	QS/UTR to 1000
6.25	↓	↓	62.5	↓
12.5	↓	↓	125	↓
25	↓	↓	250	↓
50	↓	↓	500	↓
100	↓	↓	1000	0
CALCULATIONS PERFORMED BY: DSJ				

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSJ
NUMBER OF ORGANISMS	DSJ
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSJ

TEST CHAMBER SIZE: 250mL TYPE: Polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSJ & LG @DSJ
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSJ ~~Baxter~~ VWR	digi-thermo	@DSJ ~~1946303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

March 21, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-080
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 639
Sample ID: B-1
JRA ID: 97-2729

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Claiborne
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-1 JRA #: 97-2729

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:25
Test End:	3/14/97	16:37

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	2	20
	Adjusted	20	
3. pH	Initial	7.56 - 7.98	7.65 - 8.31
	Adjusted	N/A	

JRA #: 97-2729 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.3 - 9.0	7.3 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2729 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/13/97		
	Result (mg/L)	0.09		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147*	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-1 JRA #: 97-2729

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:20
Test End:	3/14/97	16:57

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	2	20
	Adjusted	20	
3. pH	Initial	7.51 - 7.95	7.69 - 8.31
	Adjusted	N/A	

JRA #: 97-2729 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.6 - 9.0	7.7 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2729 Test Type&Organism: Acute (*Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/17/97		
Result (mg/L)		33		
QC Range (mg/L)		1	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

B-1

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		

PWC# ~~640~~ 639

REED & ASSOCIATES

Toxicity Test Sample Chain of Custody
(Please complete all information)

Facility Dept. Civil & Environ. Eng. ODU.
Address ODU. Norfolk, VA

County _____ Pipe/Outfall/Location _____
NPDES# B-1, 8Hr. Instream Waste Conc _____
Sample collected by (print&sign) _____ Affiliation _____
Type of sample ✓ (Grab): Date 03/11/97 Time 9 PM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number B-1, 8Hr Frequency of collection _____ Volume 2L
*Temperature of sample in sample collection device 24.0°C
Final temperature of effluent at sample collection point _____
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? No dechlorinated? No. If so, how? _____
Permit with interim chlorine limit? No. If yes – limit (mg/L) _____
Field pH 7.61 Field Total Residual Chlorine _____
Comments/Sample description _____

Type of test(s) to be performed _____
(Specify organisms) _____
Method of shipment Reed

Print & Sign Names

1. Relinquished by H. YANG Date 03/11/97 Time 9 PM
Received by Keith Cantel Date 3-12-97 Time 0900
2. Relinquished by Keith Cantel Date 3-12-97 Time 0915 #639
Received by Arthur Smiley Date 3-12-97 Time 0920

FOR REED LAB USE ONLY

JRA# 97-2729 Arrival Temperature 1.8°C On ice? yes
Color light yellow Odor earthy Solids none
pH 7.73 DO (mg/L) 8.6 Conductivity (µmhos/cm) 1800 @ 21.3 °C
Salinity (ppt) 2 TRC (mg/L) N/A Method —

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-2729

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - OPU OUTFALL: B-1 6

ORGANISM SOURCE: ABS JRA BATCH#: C204 HATCH DATE: 3/8/97

Conc. % / % Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.16	7.68			7.9	7.8	7.7					19.8	19.7	20.0			20	20
100	B	10	10	10									7.8												
6.25	A	10	10	10			8.29	8.12	7.55			8.1	7.8	7.8					19.9	19.7	20.0			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.26	8.13	7.54			8.2	7.9	7.7					19.9	19.7	20.0			20	20
100	B	10	10	10																					
25	A	10	10	10			8.22	8.09	7.54			8.3	8.0	7.6					20.0	19.7	20.0			20	20
100	B	10	10	10																					
50	A	10	10	10			8.17	8.04	7.53			8.5	8.1	7.6					20.0	19.7	20.0			20	20
100	B	10	10	10																					
100	A	10	10	10			7.90	7.95	7.51			9.0	8.2	7.6					19.6	19.7	20.0			20	20
100	B	10	10	10																					
INIT		DB	DB	DB																					
DATE 1997		3/12	3/13	3/14																					
TIME		1720	1700	1657																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

cute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-2729

REED & ASSOCIATES

IPDES#: N/A CLIENT: Oceana - Ohio OUTFALL: B-1 6

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M451 HATCH DATE: 3/11-12/97 1500-0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.20	7.65			7.9	7.6	7.3					19.8	19.1	19.4			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.29	8.16	7.64			8.1	7.6	7.3					19.9	19.1	19.4			20	20
100	B	10	10	10																					
12.5	A	10	8	8			8.26	8.13	7.63			8.2	7.7	7.3					19.9	19.1	19.4			20	20
85	B	10	9	9																					
25	A	10	10	10			8.22	8.11	7.61			8.3	7.7	7.2					20.0	19.1	19.4			20	20
100	B	10	10	10																					
50	A	10	8	8			8.17	8.08	7.57			8.5	7.6	7.2					20.0	19.1	19.4			20	20
85	B	10	9	9																					
100	A	10	10	10			7.90	7.98	7.56			9.0	7.7	7.3					19.6	19.1	19.4			20	20
100	B	10	10	10																					

INIT	DSB	LOG	DSB		
DATE 1997	3/12	3/13	3/14		
TIME	1725	1750	1637		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C variegatus " "

GENERAL COMMENTS

JRA# 97-2729

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: B-1 6

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/12/97	0	3/11/97 2100	3/12/97	19.6	7.90	/	9.0	/	~~1~~ 2	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid) MSB

Date	Date	Date	1997 Date	3/12	3/13	3/13	3/14			
Method	Method	Method	Time	1825	0953	1817	1030			
Minutes	Amount	Amount	Init	DSB	LOG	LOG	DSB			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/12/97	0	3/12/97	19.8	8.31	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	dilute to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB ~~2~~ 26 @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1946203~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

March 21, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-080
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 640
Sample ID: B-2
JRA ID: 97-2730

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Claiborne
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-2 JRA #: 97-2730

Test Period for Which Data is Being Submitted:
(i.e., first quarter, semiannual, or annual) _____

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:25
Test End:	3/14/97	16:55

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	21	
3. pH	Initial	7.61 - 8.03	7.65 - 8.31
	Adjusted	N/A	

JRA #: 97-2730 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.1 - 9.1	7.3 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2730 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50			>100%		
Survival		(NOEC)		(LOEC)	
	Normal Distribution (yes/no)				
	Homogeneous Variance (yes/no)				
Growth or Reproduction		(NOEC)		(LOEC)	
	Normal Distribution (yes/no)				
	Homogeneous Variance (yes/no)				
Reference Toxicant Test Date			3/13/97		
	Result (mg/L)		0.09		
	QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-2 JRA #: 97-2730

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:20
Test End:	3/14/97	16:39

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	21	
3. pH	Initial	7.56 - 8.04	7.69 - 8.31
	Adjusted	N/A	

JRA #: 97-2730 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.2 - 9.1	7.7 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2730 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/17/97		
	Result (mg/L)	33		
	QC Range (mg/L)	1	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

B-2

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		

PWC # 640

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility Dept. Civil & Environ. Eng. ODU.
Address ODU. Norfolk. VA.

County _____ Pipe/Outfall/Location _____
NPDES# B-2, 8Hr. Instream Waste Conc _____
Sample collected by (print&sign) H. YANG Affiliation _____
Type of sample ✓ (Grab): Date 03/11/97 Time 9PM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number B-2 8Hr. Frequency of collection _____ Volume 2L.
*Temperature of sample in sample collection device 24.0°C
Final temperature of effluent at sample collection point _____
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? No. dechlorinated? No. If so, how? _____
Permit with interim chlorine limit? No. If yes – limit (mg/L) _____
Field pH 7.65 Field Total Residual Chlorine _____
Comments/Sample description _____

Type of test(s) to be performed _____
(Specify organisms) _____
Method of shipment Reed

Print & Sign Names

1. Relinquished by H. YANG Date 03/11/97 Time 9PM
   Received by Keith Crafel Date 3-12-97 Time 0900
2. Relinquished by Keith Crafel Date 3-12-97 Time 0915 #640
   Received by Catherine Miller Date 3/12/97 Time 0920

FOR REED LAB USE ONLY

JRA# 97-2730 Arrival Temperature 1.8°C. On ice? yes
Color lifter yellow Odor earthy Solids None
pH 7.82 DO (mg/L) 8.6 Conductivity (µmhos/cm) 1800 @ 20.5 °C
Salinity (ppt) 1 TRC (mg/L) ~~<0.01~~ 0.05 NH Method —

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-273

NPDES#: N/A CLIENT: Oceana - ODU OUTFALL: B-2 7

ORGANISM SOURCE: ABS JRA BATCH#: C204 HATCH DATE: 3/8/97

Conc. % / % Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.16	~~7.65~~ 7.87			7.9	7.8	~~7.5~~ 7.7					19.8	19.1	20.0			20	20
100	B	10	10	10					7.69																
6.25	A	10	10	10			8.30	8.15	7.52			8.1	8.0	7.3					19.8	19.1	20.0			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.28	8.14	7.52			8.2	8.1	7.2					19.8	19.1	20.0			20	20
100	B	10	10	10																					
25	A	10	10	10			8.25	8.14	7.53			8.4	8.1	7.2					19.9	19.1	20.0			20	20
95	B	10	10	9																					
50	A	10	10	10			8.20	8.11	7.54			8.6	8.0	7.1					19.9	19.1	20.0			20	20
95	B	10	9	9																					
100	A	10	10	10			7.95	8.04	7.56			9.1	7.9	7.2					19.7	19.1	20.0			~~20~~ 21	21
95	B	10	10	9																					
INIT		DB	LDG	LDG																					
DATE 1997		3/12	3/13	3/14																					
TIME		1720	1808	1639																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

:ute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-2730

REED & ASSOCIATES

PDES#: N/A CLIENT: Occoma - OJU OUTFALL: B-2 7

RGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M451 HATCH DATE: 3/11-12/97 1500-0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 80%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.20	7.65			7.9	7.6	7.3					19.8	19.1	19.4			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.30	8.17	7.64			8.1	7.7	7.3					19.8	19.1	19.4			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.28	8.16	7.63			8.2	7.8	7.2					19.8	19.1	19.4			20	20
100	B	10	10	10																					
25	A	10	10	10			8.25	8.14	7.62			8.4	7.8	7.2					19.9	19.1	19.4			20	20
95	B	10	9	9																					
50	A	10	10	10			8.20	8.12	7.62			8.6	7.6	7.1					19.9	19.1	19.4			20	20
100	B	10	10	10																					
100	A	10	10	10			7.95	8.03	7.61			9.1	7.5	7.1					19.7	19.1	19.4			21	21
100	B	10	10	10																					
INIT		DSJ	LDG	DSJ																					
DATE 1997		3/12	3/13	3/14																					
TIME		1725	1405	1655																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

" *C variegatus* " " GENERAL COMMENTS

JRA# 97-2730

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: B.2 7

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/12/97	0	3/11/97 2100	3/12/97	19.7	7.95	/	9.1	/	1	21	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	Date (1997)	3/12	3/13	3/13	3/14
Method	Method	Method	Time	1825	0953	1817	1030
Minutes	Amount	Amount	Init	DSB	LDG	LDG	DSB

DILUENT (30ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/12/97	0	3/12/97	19.8	8.31	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	dilute to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250mL TYPE: Polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB & LG @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1046203~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

March 20, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-080
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 641
Sample ID: B-3
JRA ID: 97-2731

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Clarkson
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-3 JRA #: 97-2731

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:25
Test End:	3/14/97	16:51

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.55 - 8.08	7.65 - 8.31
	Adjusted	N/A	

JRA #: 97-2731 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	6.6 - 9.1	7.3 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2731 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/13/97		
Result (mg/L)		0.09		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-3 JRA #: 97-2731

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:20
Test End:	3/14/97	16:44

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.52 - 8.06	7.69 - 8.31
	Adjusted	N/A	

JRA #: 97-2731 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.4 - 9.1	7.7 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2731 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/17/97		
	Result (mg/L)	33		
	QC Range (mg/L)	1	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

B-3

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		

PWC # 641

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility Dept. Civil & Environ. Eng. ODU.
Address ODU. Norfolk. VA.

County _____ Pipe/Outfall/Location _____
NPDES# B-3. 8 Hr. Instream Waste Conc _____
Sample collected by (print&sign) H. YANG Affiliation _____
Type of sample ✓ (Grab): Date 03/11/97 Time 9 PM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number B-3. 8Hr. Frequency of collection _____ Volume 2L.
*Temperature of sample in sample collection device 24.0°C
Final temperature of effluent at sample collection point _____
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? No. dechlorinated? No. If so, how? _____
Permit with interim chlorine limit? No. If yes – limit (mg/L) _____
Field pH 7.69 Field Total Residual Chlorine _____
Comments/Sample description _____

Type of test(s) to be performed _____
(Specify organisms) _____
Method of shipment Reed

Print & Sign Names

1. Relinquished by H. YANG Date 03/11/97 Time 9 PM.
   Received by Keith Cuff Date 3-12-97 Time 0900 #641
2. Relinquished by Keith Cuff Date 3-12-97 Time 0915
   Received by Arthur Miller Date 3/12/97 Time 0920

FOR REED LAB USE ONLY

JRA# 97-2731 Arrival Temperature 1.9°C On ice? Yes
Color light yellow Odor earthy Solids none
pH 7.91 DO (mg/L) 8.6 Conductivity (µmhos/cm) 1800 @ 21.2 °C
Salinity (ppt) 1 TRC (mg/L) — Method —

Rev 5/15/94

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-2731

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - ODU OUTFALL: B-3 8

ORGANISM SOURCE: ABS JRA BATCH#: C204 HATCH DATE: 3/8/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.16	7.69			7.9	7.8	7.7					19.8	19.1	20.0			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.31	8.15	7.50			8.0	7.8	7.7					19.8	19.1	20.0			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.30	8.16	7.51			8.1	7.9	7.7					19.9	19.1	20.0			20	20
100	B	10	10	10																					
25	A	10	9	9			8.28	8.16	7.52			8.3	8.0	7.6					19.9	19.1	20.0			20	20
95	B	10	10	10																					
50	A	10	10	10			8.21	8.13	7.53			8.5	8.0	7.5					20.0	19.1	20.0			20	20
100	B	10	10	10																					
100	A	10	10	10			8.03	8.06	7.52			9.1	8.0	7.4					19.7	19.1	20.0			20	20
100	B	10	10	10																					

INIT		DB	LDG	DB	
DATE 1997		3/12	3/13	3/14	
TIME		1720	1610	1644	

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-2731

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - Olu OUTFALL: B-3 8

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M451 HATCH DATE: 3/11-12/97 1500-0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.20	7.65			7.9	7.6	7.3					19.8	19.1	19.4			20	20
100	B	10	10	10																					
6.25	A	10	9	9			8.31	8.18	7.50			8.0	7.7	7.2					19.8	19.1	19.4			20	20
90	B	10	9	9																					
12.5	A	10	10	10			8.30	8.18	7.51			8.1	7.7	7.0					19.9	19.1	19.4			20	20
100	B	10	10	10																					
25	A	10	10	10			8.28	8.17	7.51			8.3	7.6	6.8					19.9	19.1	19.4			20	20
100	B	10	10	10																					
50	A	10	9	9			8.21	8.15	7.53			8.5	7.6	6.7					20.0	19.1	19.4			20	20
95	B	10	10	10																					
100	A	10	10	9			8.03	8.08	7.55			7.1	7.6	6.6					19.7	19.1	19.4			20	20
90	B	10	10	9																					

INIT	DSS	LDG	DSS		
DATE 1997	3/12	3/13	3/14		
TIME	1725	1800	1651		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C variegatus " "

GENERAL COMMENTS

JRA# 97-2731

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: B-3 8

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/12/97	0	3/11/97 2100	3/12/97	19.7	8.03	/	9.1	/	1	20	/	/

DO Adj.	pH Adj.	TRC Adj.	Feedings (Mysid)							
Date	Date	Date	1997 Date	3/12	3/13	3/13	3/14			
Method	Method	Method	Time	1825	0953	1817	1030			
Minutes	Amount	Amount	Init	DSB	LOG	LOG	DSB			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/12/97	0	3/12/97	19.8	8.31	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250mL TYPE: Polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB ~~2~~ ~~2~~ G @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1946203~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

March 21, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-080
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 635
Sample ID: Mix L. R.R.
JRA ID: 97-2725

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Claiborne
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Mix L. R.R. JRA #: 97-2725

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:25
Test End:	3/14/97	16:30

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.60 - 8.02	7.65 - 8.31
	Adjusted	N/A	

JRA #: 97-2725 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.3 - 9.1	7.3 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2725 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/13/97		
Result (mg/L)		0.09		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Mix L. R.R. JRA #: 97-2725

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:20
Test End:	3/14/97	17:08

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.56 - 8.01	7.69 - 8.31
	Adjusted	N/A	

JRA #: 97-2725 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.4 - 9.1	7.7 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2725 Test Type&Organism: Acute (*Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/17/97		
Result (mg/L)		33		
QC Range (mg/L)		1	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

Mix L. R.R.

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		

PWC # 635

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility Dept. Civil & Environ. Eng. ODU
Address ODU, Norfolk, VA.

County _____ Pipe/Outfall/Location _____
NPDES# Mix L. RR Instream Waste Conc _____
Sample collected by (print&sign) H. YANG Affiliation _____
Type of sample ✓ (Grab): Date 03/11/97 Time 11 AM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number Mix L. RR Frequency of collection _____ Volume 2 L.

*Temperature of sample in sample collection device 28.0°C
Final temperature of effluent at sample collection point _____
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? No dechlorinated? No If so, how? _____
Permit with interim chlorine limit? No If yes – limit (mg/L) _____
Field pH 7.25 Field Total Residual Chlorine _____
Comments/Sample description _____

Type of test(s) to be performed _____
(Specify organisms) _____
Method of shipment Reed

Print & Sign Names

1. Relinquished by H. YANG Date 03/11/97 Time 11 AM #635
Received by Keith Crafts Date 3-12-97 Time 0900
2. Relinquished by Keith Crafts Date 3-12-97 Time 0915
Received by Cathie Miller Date 3/12/97 Time 0920
See PWC C-O-C

FOR REED LAB USE ONLY

JRA# 97-2725 Arrival Temperature 1.8°C. On ice? yes
Color light yellow Odor earthy Solids none
pH 7.86 DO (mg/L) 9.0 Conductivity (µmhos/cm) 1800 @ 20.1°C
Salinity (ppt) 1 TRC (mg/L) — Method —

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-2725

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - ODU OUTFALL: Mix L. of RR 2

ORGANISM SOURCE: ABS JRA BATCH#: C204 HATCH DATE: 3/8/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.16	7.69			7.9	7.8	7.7					19.8	19.7	20.0			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.31	8.14	7.66			8.0	7.9	7.7					19.8	19.7	20.0			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.30	8.12	7.64			8.1	8.0	7.7					19.8	19.7	20.0			20	20
100	B	10	10	10																					
25	A	10	10	10			8.28	8.08	7.63			8.2	8.0	7.6					19.9	19.7	20.0			20	20
100	B	10	10	10																					
50	A	10	10	10			8.21	7.99	7.61			8.4	8.1	7.4					19.9	19.7	20.0			20	20
100	B	10	10	10																					
100	A	10	10	10			8.01	7.91	7.56			9.1	8.1	7.4					19.6	19.7	20.0			20	20
100	B	10	10	10																					
INIT		DSB	DSB	DSB																					
DATE 1997		3/12	3/13	3/14																					
TIME		1720	1650	1708																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-2725

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - Ohu OUTFALL: Mix L. of RR 2

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M451 HATCH DATE: 3/11-12/97 1500-0800

Conc.(%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.20	7.65			7.9	7.6	7.3					19.8	19.1	19.4			20	20
100	B	10	10	10																					
6.25	A	10	9	9			8.31	8.16	7.65			8.0	7.5	7.1					19.8	19.1	19.4			20	20
95	B	10	10	10																					
12.5	A	10	10	10			8.30	8.15	7.64			8.1	7.5	7.2					19.8	19.1	19.4			20	20
100	B	10	10	10																					
25	A	10	9	9			8.28	8.13	7.64			8.2	7.6	7.3					19.9	19.1	19.4			20	20
90	B	10	9	9																					
50	A	10	9	9			8.21	8.11	7.63			8.4	7.5	7.3					19.9	19.1	19.4			20	20
85	B	10	8	8																					
100	A	10	10	10			8.01	8.02	7.60			9.1	7.4	7.3					19.6	19.1	19.4			20	20
100	B	10	10	10																					

INIT	DSB	LOG	DSB		
DATE 1997	3/12	3/13	3/14		
TIME	1725	1725	1630		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C variegatus " " GENERAL COMMENTS

JRA# 97-2725

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: Mix L 2

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/12/97	0	3/11/97 1100	3/12/97	19.6	8.01	/	9.1	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	Date (1997)	3/12	3/13	3/13	3/14		
Method	Method	Method	Time	1825	0953	1817	1030		
Minutes	Amount	Amount	Init	DSJ	LOG	LOG	DSJ		

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/12/97	0	3/12/97	19.8	8.31	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (%) mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (%) mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	dilute to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSJ

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSJ
NUMBER OF ORGANISMS	DSJ
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSJ

TEST CHAMBER SIZE: 250mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSJ & RG @DSJ
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSJ ~~Baxter~~ VWR	digi-thermo	@DSJ ~~1046303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3.19.96

March 20, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-080
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 634
Sample ID: Feed S.
JRA ID: 97-2724

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Claiborne
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Feed S. JRA #: 97-2724

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:25
Test End:	3/14/97	16:51

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): All vessels from test initiation

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.47 - 7.49	7.65 - 8.31
	Adjusted	N/A	

JRA #: 97-2724 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	0.1 - 9.1	7.3 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2724 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		17.7%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/13/97		
	Result (mg/L)	0.09		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Feed S. JRA #: 97-2724

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/12/97	17:20
Test End:	3/14/97	16:48

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): All vessels from test initiation

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.47 - 7.70	7.69 - 8.31
	Adjusted	N/A	

JRA #: 97-2724 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	0.1 - 9.1	7.7 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-2724 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		52%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/17/97		
	Result (mg/L)	33		
	QC Range (mg/L)	1	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

Feed S.

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	<6.25	31		
2/28/97	Invalid	35		
3/12/97	17.7	52		

PWC#634

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility Dept. Civil & Environ. Eng. ODU

Address ODU. Norfolk. VA.

County _____ Pipe/Outfall/Location _____

NPDES# Feed S. Instream Waste Conc _____

Sample collected by (print&sign) H. YANG Affiliation _____

Type of sample ✓ (Grab): Date 03/11/97 Time 11 AM

_____ (Composite): From Date _____ Time _____

To Date _____ Time _____

Subsamples comprising composite:

Number Feed. S. Frequency of collection _____ Volume 2 L

*Temperature of sample in sample collection device 26.0°C

Final temperature of effluent at sample collection point _____

*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____

*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)

Is the sample chlorinated? No dechlorinated? No If so, how? _____

Permit with interim chlorine limit? No. If yes – limit (mg/L) _____

Field pH 6.74 Field Total Residual Chlorine _____

Comments/Sample description _____

Type of test(s) to be performed _____

(Specify organisms) _____

Method of shipment _____

Print & Sign Names

1. Relinquished by H. YANG Date 03/11/97 Time 11 AM #634
   Received by K. Cautchfield Date 3-12-97 Time 0901
2. Relinquished by Keith [illegible] Date 3-12-97 Time 0915
   Received by Arthur Miller Date 3/12/97 Time 0920

See PNC COC.

FOR REED LAB USE ONLY

JRA# 97-2724 Arrival Temperature 1.0°C. On ice? yes

Color light orange Odor yeast Solids none

pH 7.12 DO (mg/L) 9.8 Conductivity (µmhos/cm) 1600 @ 19.8 °C

Salinity (ppt) 1 TRC (mg/L) — Method —

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CLIENT INFORMATION

COMPANY/COMMAND: Oceana CODE:
CONTACT: Douglas Kirk
PHONE: 433-3439 EXT: FAX:
J.O. #: 19122290
SIGNATURE:
PERMIT NO.:

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
CLO RH DCABJ	634	Feed S.	START	3/11/97	1100	G	HY	L	1	1	Biomass		97-27	24	GBr
			STOP												
	635	Mix L. RR.	START		1100								97-27	25	
			STOP												
	636	A-1	START		2100								97-27	26	
			STOP												
	637	A-2	START		2100								97-27	27	
			STOP												
	638	A-3	START		2100								97-27	28	
			STOP												
	639	B-1	START		2100								97-27	29	
			STOP												
	640	B-2	START		2100								97-27	30	
			STOP												

TYPE	MATRIX	CONTAINER	PRESERVATIVE
G - GRAB	L - LIQUID / SW - SWIPE	P - PLASTIC / B - BAG	A - AMBER(glass)
CF - COMPOSITE, FLOW	S - SOLID	GL - GLASS / C - CARTRIDGE	1 - COOL TO 4 C / 5 - HCL pH<2
CT - COMPOSITE, TIME	GS - GAS	T - TEFLON / TL - TEFLON LINED LID	2 - HNO3 pH<2 / 6 - 0.008% Na2S2O3, 4 C
	SS - SEMI SOLID	V - VOA / H - HEXANE RINSED	3 - H2SO4 pH<2 / 7 - FIELD FILTER
			4 - NaOH pH>12 / 8 - NONE

TURNAROUND (Days): _____ *(FOR RUSH TURNAROUND STATE REASON BELOW)*

COMMENTS:

SAMPLE DISPOSAL: ( )RETURN TO CLIENT ( )DISPOSAL BY LAB

REGULATION APPLIED:

RCRA ( )	HRSD ( )
SDWA ( )	TSCA ( )
CWA ( )	PHOTO ( )
CAA ( )	OTHER ( )

Arrival Temp. 1.8°C

SAMPLING/COLLECTION CHARGE: $
POSSIBLE SAMPLE HAZARDS:
COMMENTS:

D.O. NUMBER: INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).**
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. – THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM – 3:30 PM).*

FOR LAB USE ONLY — CHECK BOX & INITIAL IF OKAY — SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: Rad	DATE/TIME: 3/12/97 0755
RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: Rad	DATE/TIME: 3/12/97 1035
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

CONTINUATION SHEET

SHEET 2 OF 2

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

P.O.C.: Douglas Kirk
COMMAND: Oceana

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
000 Bit	641	B-3	START	3/4/97	2140	G	HY	L	1	1	Bioassay		97-27	31	ABr
000 BJ			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												

COMMENTS: Arrival Temp. 1.8°C

D.O. NUMBER:
CONTRACT LAB:
CONTRACT NO.(S):
OFFICIAL USE ONLY
INIT.:
DATE:

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).* *ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.
2. *SAMPLES RECEIVED AFTER 2:00 PM MON. -- THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).*

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY: SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: PWC	DATE/TIME: 3/12/97 0955
RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: PWC	DATE/TIME: 3/12/97 1035
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-2724

NPDES#: N/A CLIENT: Oceana - ODU OUTFALL: Feet S. 1

ORGANISM SOURCE: ABS JRA BATCH#: C204 HATCH DATE: 3/8/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.16	7.69			7.9	7.8	7.7					19.8	19.7	20.0			20	20
100	B	10	10	10																					
6.25	A	10	9	9			8.30	7.88	7.66			8.0	7.6	8.1					19.9	19.7	20.0			20	20
95	B	10	10	10																					
12.5	A	10	10	10			8.27	7.82	7.65			8.1	7.7	8.1					19.9	19.7	20.0			20	20
100	B	10	10	10																					
25	A	10	10	8			8.18	7.81	7.70			8.3	7.3	8.1					19.9	19.7	20.0			20	20
90	B	10	10	10																					
50	A	10	6	6			8.01	7.57	7.68			8.5	0.1	7.5					20.0	19.7	20.0			20	20
65	B	10	7	7																					
100	A	10	2	0			7.47	7.63	7.70			9.1	0.1	7.0					19.6	19.7	20.0			20	20
0	B	10	4	0																					
													*												

INIT		DS	LDG	DS	
DATE 19 97		3/12	3/13	3/14	
TIME		1720	1700	1648	

* low DO even with aeration ~100 bubbles/min.

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-2724

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - Ohio OUTFALL: Feed S.

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M451 HATCH DATE: 3/11-12/97 1500-0800

Conc. (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.31	8.20	7.65			7.9	7.6	7.3					19.8	19.7	20.0			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.30	7.87	7.65			8.0	7.6	8.2					19.9	19.7	20.0			20	20
100	B	10	10	10																					
12.5	A	10	10	8			8.27	7.85	7.67			8.1	7.4	8.1					19.9	19.7	20.0			20	20
90	B	10	10	10																					
25	A	10	3	2			8.18	7.81	7.69			8.3	7.0	8.0					19.9	19.7	20.0			20	20
10	B	10	1	0																					
50	A	10	0	–			8.01	7.55	–			8.5	0.1	–					20.0	19.7	–			20	20
0	B	10	0	–																					
100	A	10	0	–			8.57 7.47	7.49	–			9.1	0.1	–					19.6	19.7	–			20	20
0	B	10	0	–									(A)												

INIT	1087	1106	1083		
DATE 1997	3/12	3/13	3/14		
TIME	1725	1700	1651		

(A) Low DO even with aeration ~100 bubbles/min

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

LC50 = 52%

TRIMMED SPEARMAN-KARBER METHOD. VERSION 1.5

DATE: 3/12/97 TEST NUMBER: 97-2724 DURATION: 48 hours
TOXICANT : Feed S.
SPECIES: C. variegatus

RAW DATA: Concentration (%)	Number Exposed	Mortalities
.00	20	0
6.25	20	1
12.50	20	0
25.00	20	2
50.00	20	7
100.00	20	20

SPEARMAN-KARBER TRIM: 2.50%

SPEARMAN-KARBER ESTIMATES: LC50: 52.35
95% LOWER CONFIDENCE: 43.49
95% UPPER CONFIDENCE: 63.02

NOTE: MORTALITY PROPORTIONS WERE NOT MONOTONICALLY INCREASING.
ADJUSTMENTS WERE MADE PRIOR TO SPEARMAN-KARBER ESTIMATION.

ACUTE TOXICITY TEST RESULTS

30 ppm AFFF

MARCH 19, 1997

March 31, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-083
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AC
NPDES Permit #: N/A
PWC #: 670
Sample ID: A-1
JRA ID: 97-3154

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverly E. Blanchard
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-1 JRA #: 97-3154

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	16:00
Test End:	3/22/97	15:54

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.12 - 8.13	7.70 - 8.30
	Adjusted	N/A	

JRA #: 97-3154 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	6.8 - 8.6	7.0 - 8.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3154 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/24/97		
	Result (mg/L)	0.09		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-1 JRA #: 97-3154

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	15:50
Test End:	3/22/97	15:33

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 3 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.12 - 8.21	7.70 - 8.28
	Adjusted	N/A	

JRA #: 97-3154 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.6 - 8.6	7.5 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3154 Test Type&Organism: Acute (*Cyprinodon variegatus*)

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/24/97		
	Result (mg/L)	>40		
	QC Range (mg/L)	2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

A-1

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY
Address CIVIL & ENV.TAL ENG. DEPT.
KDH 135 NORFOLK VA 23529-0241

County / Pipe/Outfall/Location /
NPDES# / Instream Waste Conc
Sample collected by (print&sign) yang Affiliation
Type of sample ✓ (Grab): Date 3/19/97 Time 20:00 PM
(Composite): From Date Time
To Date Time

Subsamples comprising composite:
Number A-1. 8 Hr. Frequency of collection Volume 2 L.

*Temperature of sample in sample collection device 28.5°C.
Final temperature of effluent at sample collection point
*Is sample collection device chilled? Is sample packed on ice for shipment?
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? No dechlorinated? If so, how?
Permit with interim chlorine limit? No If yes – limit (mg/L)
Field pH 7.50 Field Total Residual Chlorine
Comments/Sample description A-1. 8 Hr.

Type of test(s) to be performed ACUTE TOXICITY TESTING
(Specify organisms) CYPRINODON VARIEGATUS & MYSID SHRIMP
Method of shipment

Print & Sign Names

1. Relinquished by yang Date 03/19/97 Time 20:00 PM
   Received by [signature] Date 3-20-97 Time Noon
2. Relinquished by [signature] Date 3-20-97 Time 12:20
   Received by [signature] Date 3/20/97 Time 1245

FOR REED LAB USE ONLY

JRA# 97-3154 Arrival Temperature 2.9 On ice? yes
Color tan Odor earthy Solids none
pH 6.88 DO (mg/L) 8.5 Conductivity (µmhos/cm) 1800 @ 19.5 °C
Salinity (ppt) 1 TRC (mg/L) — Method —

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3154

REED & ASSOCIATES

NPDES#: N/A CLIENT: Ocean - OPU OUTFALL: A-1

ORGANISM SOURCE: ABS JRA BATCH#: C205 HATCH DATE: 3/17/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			7.70	8.28	8.19			79	7.5	7.5					19.7	19.3	19.5			20	20
100	B	10	10	10																					
6.25	A	10	10	10			7.50	8.26	8.31			8.2	7.7	8.6					19.8	19.3	19.5			20	20
100	B	10	10	10																					
12.5	A	10	10	10			7.36	8.27	8.31			8.2	7.7	8.6					19.8	19.3	19.5			20	20
100	B	10	10	10																					
25	A	10	10	10			7.25	8.25	8.30			8.3	7.8	8.6					19.8	19.3	19.5			20	20
100	B	10	10	10																					
50	A	10	10	10			7.18	8.21	8.29			8.4	7.6	8.6					19.7	19.3	19.5			20	20
100	B	10	10	10																					
100	A	10	10	10			7.12	8.11	8.21			8.6	7.6	8.4					19.5	19.3	19.5			20	20
100	B	10	10	10																					

INIT		OSB	OSB	LOG		
DATE 1997		3/20	3/21	3/22		
TIME		1550	1715	1533		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

cute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3154

REED & ASSOCIATES

PDES#: N/A CLIENT: Oceana - Odd OUTFALL: A-1

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M453 HATCH DATE: 3/19-20/97 1500-0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 80%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			7.70	8.27	8.30			7.9	7.0	8.5					19.7	20.4	20.5			20	20
100	B	10	10	10																					
6.25	A	10	10	9			7.50	8.23	8.16			8.2	6.9	7.1					19.8	20.4	20.5			20	20
95	B	10	10	10																					
12.5	A	10	10	10			7.36	8.24	8.16			8.2	7.0	7.0					19.8	20.4	20.5			20	20
100	B	10	10	10																					
25	A	10	10	9			7.25	8.23	8.18			8.3	6.9	6.9					19.8	20.4	20.5			20	20
95	B	10	10	10																					
50	A	10	10	10			7.18	8.18	8.17			8.4	6.7	7.0					19.7	20.4	20.5			20	20
100	B	10	10	10																					
100	A	10	10	10			7.12	8.09	8.13			8.6	6.8	7.2					19.5	20.4	20.5			20	20
95	B	10	10	9																					
INIT		LDG	DSS	LDG																					
DATE 1997		3/20	3/21	3/22																					
TIME		1600	1655	1554																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

GENERAL COMMENTS

JRA# 97-3154

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: A-1

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/20/97	0	3/19/97 2000	3/20/97	19.5	7.12	/	8.6	/	1	20	—	—

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	Date (1997)	3/20	3/21	3/21	3/22			
Method	Method	Method	Time	1630	1205	1730	1020			
Minutes	Amount	Amount	Init	LDG	LDG	DSB	LDG			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/20/97	0	3/20/97	19.7	7.70	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute To 1000
6.25	↓	↓	62.5	↓
12.5	↓	↓	125	↓
25	↓	↓	250	↓
50	↓	↓	500	↓
100	↓	↓	1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250 mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200 mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	2 RG
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	~~Baxter~~ VWR	digi-thermo	~~1016303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3.19.96

March 31, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-083
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AC
NPDES Permit #: N/A
PWC #: 668
Sample ID: A-2
JRA ID: 97-3152

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverly E. Blanchard
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-2 JRA #: 97-3152

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	16:00
Test End:	3/22/97	15:58

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	6.96 - 8.22	7.70 - 8.30
	Adjusted	N/A	

JRA #: 97-3152 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	6.9 - 8.6	7.0 - 8.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3152 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/24/97		
	Result (mg/L)	0.09		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-2 JRA #: 97-3152

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	15:50
Test End:	3/22/97	15:35

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 3 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	6.96 - 8.20	7.70 - 8.28
	Adjusted	N/A	

JRA #: 97-3152 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.6 - 8.6	7.5 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3152 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/24/97		
Result (mg/L)		>40		
QC Range (mg/L)		2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

A-2

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY
Address CIVIL & ENVIRONMAL ENG. DEPT.
KDH 135 NORFOLK VA 23529-0241

County ✓ Pipe/Outfall/Location ✓
NPDES# ✓ Instream Waste Conc
Sample collected by (print&sign) yang Affiliation
Type of sample ✓ (Grab): Date 3/19/97 Time 20:00 PM
(Composite): From Date Time
To Date Time

Subsamples comprising composite:
Number A-2. 8Hr Frequency of collection Volume 2L.
*Temperature of sample in sample collection device 28.5°C
Final temperature of effluent at sample collection point
*Is sample collection device chilled? Is sample packed on ice for shipment?
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? No dechlorinated? If so, how?
Permit with interim chlorine limit? If yes – limit (mg/L)
Field pH 7.54 Field Total Residual Chlorine
Comments/Sample description A-2. 8Hr.

Type of test(s) to be performed ACUTE TOXICITY TESTING
(Specify organisms) CYPRINODON VARIEGATUS & MYSID SHRIMP
Method of shipment Reed

Print & Sign Names

1. Relinquished by yang Date 03/19/97 Time 20:00 PM
   Received by [signature] Date 3-20-97 Time Noon
2. Relinquished by [signature] Date 3-20-97 Time 12:20
   Received by [signature] Date 3/20/97 Time 1245

FOR REED LAB USE ONLY

JRA# 97-3152 Arrival Temperature 2.9 On ice? yes
Color tan Odor earthy Solids none
pH 6.69 DO (mg/L) 8.6 Conductivity (µmhos/cm) 1800 @ 19.6°C
Salinity (ppt) 1 TRC (mg/L) – Method –

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3152

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - OPU OUTFALL: A-2

ORGANISM SOURCE: ABS JRA BATCH#: C205 HATCH DATE: 3/17/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			7.70	8.28	8.19			7.9	7.5	7.5					19.7	19.3	19.5			20	20
100	B	10	10	10																					
6.25	A	10	10	10			7.39	8.24	8.31			8.0	7.5	8.5					19.8	19.3	19.5			20	20
100	B	10	10	10																					
12.5	A	10	10	10			7.30	8.27	8.30			8.1	7.5	8.6					19.8	19.3	19.5			20	20
100	B	10	10	10																					
25	A	10	10	10			7.22	8.26	8.31			8.2	7.7	8.6					19.8	19.3	19.5			20	20
100	B	10	10	10																					
50	A	10	10	10			7.12	8.21	8.28			8.4	7.6	8.6					19.7	19.3	19.5			20	20
100	B	10	10	10																					
100	A	10	10	10			6.96	8.09	8.20			8.6	7.6	8.5					19.6	19.3	19.5			20	20
100	B	10	10	10																					
INIT		DB	DB	LK																					
DATE 1997		3/20	3/21	3/22																					
TIME		1550	1716	1535																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

:ute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3152

REED & ASSOCIATES

PDES#: N/A CLIENT: Oceana - ODU OUTFALL: A-2

RGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M453 HATCH DATE: 3/19-20/97 1500-0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			7.70	8.27	8.30			7.9	7.0	8.5					19.7	20.4	20.5			20	20
100	B	10	10	10																					
6.25	A	10	10	10			7.39	8.25	8.16			8.0	6.9	7.0					19.8	20.4	20.5			20	20
100	B	10	10	10																					
12.5	A	10	10	9			7.30	8.26	8.18			8.1	6.9	7.0					19.8	20.4	20.5			20	20
90	B	10	10	9																					
25	A	10	10	8			7.22	8.24	8.20			8.2	7.0	7.4					19.8	20.4	20.5			20	20
80	B	10	10	8																					
50	A	10	10	10			7.12	8.19	8.21			8.4	7.1	7.4					19.7	20.4	20.5			20	20
100	B	10	10	10																					
100	A	10	10	10			6.96	8.07	8.22			8.6	6.9	7.3					19.6	20.4	20.5			20	20
100	B	10	10	10																					
INIT		LOG	DSJ	LOG																					
DATE 1997		3/20	3/21	3/22																					
TIME		1600	1659	1558																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

GENERAL COMMENTS

JRA# 97-3152

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: A-2

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/20/97	0	3/19/97 2000	3/20/97	19.6	6.96	/	8.6	/	1	20	—	—

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	Date (1997)	3/20	3/21	3/21	3/22			
Method	Method	Method	Time	1630	1205	1730	1020			
Minutes	Amount	Amount	Init	LDG	LDG	DSJ	LDG			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9 (DSJ)	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/20/97	0	3/20/97	19.7	7.70	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute To 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSJ

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSJ
NUMBER OF ORGANISMS	DSJ
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSJ

TEST CHAMBER SIZE: 250 mL TYPE: Polystyrene VOLUME OF TEST SOLUTION: 200 mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	(DSJ) 2 RG (DSJ)
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	(DSJ) ~~Baxter~~ VWR	digi-thermo	(DSJ) ~~1946303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

March 31, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-083
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AC
NPDES Permit #: N/A
PWC #: 667
Sample ID: A-3
JRA ID: 97-3151

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-3 JRA #: 97-3151

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	16:00
Test End:	3/22/97	16:01

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	6.90 - 8.11	7.70 - 8.30
	Adjusted	N/A	

JRA #: 97-3151 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (umhos/cm)	N/A	N/A
8. DO (mg/L)	7.1 - 8.6	7.0 - 8.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3151 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/24/97		
	Result (mg/L)	0.09		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-3 JRA #: 97-3151

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	15:50
Test End:	3/22/97	15:38

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 3 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	6.90 - 8.18	7.70 - 8.28
	Adjusted	N/A	

JRA #: 97-3151 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (umhos/cm)	N/A	N/A
8. DO (mg/L)	7.7 - 8.6	7.5 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3151 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/24/97		
Result (mg/L)		>40		
QC Range (mg/L)		2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

A-3

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY

Address CIVIL & ENV.TAL ENG. DEPT.
KDH 135 NORFOLK VA 23529-0241

County / Pipe/Outfall/Location /

NPDES# / Instream Waste Conc

Sample collected by (print&sign) yang Affiliation

Type of sample ✓ (Grab): Date 3/19/97 Time 20:00 PM

____ (Composite): From Date Time

To Date Time

Subsamples comprising composite:

Number A-3, 8Hr. Frequency of collection Volume 2L.

*Temperature of sample in sample collection device 28.5°C

Final temperature of effluent at sample collection point

*Is sample collection device chilled? Is sample packed on ice for shipment?

***It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)**

Is the sample chlorinated? No dechlorinated? If so, how?

Permit with interim chlorine limit? No. If yes – limit (mg/L)

Field pH 7.50 Field Total Residual Chlorine

Comments/Sample description A-3. 8Hr.

Type of test(s) to be performed ACUTE TOXICITY TESTING

(Specify organisms) CYPRINODON VARIEGATUS & MYSID SHRIMP

Method of shipment Fed

Print & Sign Names

1. Relinquished by yang Date 03/19/97 Time 20:00 pm
   Received by [signature] Date 3-20-97 Time Noon
2. Relinquished by [signature] Date 3-20-97 Time 12:20
   Received by [signature] Date 3/20/97 Time 1245

FOR REED LAB USE ONLY

JRA# 97-3151 Arrival Temperature 2.9 On ice? yes

Color tan Odor earthy Solids none

pH 6.64 DO (mg/L) 8.5 Conductivity (µmhos/cm) 1800 @ 19.7 °C

Salinity (ppt) 1 TRC (mg/L) — Method —

Rev 5/16/94

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3151

NPDES#: N/A CLIENT: Ocean - OPU OUTFALL: A.3

ORGANISM SOURCE: ABS JRA BATCH#: C205 HATCH DATE: 3/17/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			7.70	8.28	8.19			7.9	7.5	7.5					19.7	19.3	19.5			20	20
100	B	10	10	10																					
6.25	A	10	10	10			7.50	8.28	8.29			8.1	7.8	8.5					19.7	19.3	19.5			20	20
100	B	10	10	10																					
12.5	A	10	10	10			7.39	8.26	8.29			8.1	7.7	8.5					19.8	19.3	19.5			20	20
100	B	10	10	10																					
25	A	10	10	10			7.32	8.26	8.28			8.2	7.7	8.6					19.8	19.3	19.5			20	20
100	B	10	10	10																					
50	A	10	10	10			7.18	8.20	8.26			8.3	7.8	8.5					19.8	19.3	19.5			20	20
100	B	10	10	10																					
100	A	10	10	10			6.90	8.08	8.18			8.6	7.7	8.5					19.7	19.3	19.5			20	20
100	B	10	10	10																					

INIT		DBS	DBS	LOG		
DATE 1997		3/20	3/21	3/22		
TIME		1550	1721	1538		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3151

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - ODU OUTFALL: A-3

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M453 HATCH DATE: 3/19-20/97 1500-0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			7.70	8.27	8.30			7.9	7.0	8.5					19.7	20.4	20.5			20	20
100	B	10	10	10																					
6.25	A	10	10	9			7.50	8.22	8.15			8.1	7.0	7.0					19.7	20.4	20.5			20	20
85	B	10	10	8																					
12.5	A	10	10	10			7.39	8.24	8.16			8.1	7.0	7.2					19.8	20.4	20.5			20	20
95	B	10	10	9																					
25	A	10	10	9			7.32	8.23	8.17			8.2	7.1	7.2					19.8	20.4	20.5			20	20
95	B	10	10	10																					
50	A	10	10	10			7.18	8.18	8.17			8.3	7.3	7.4					19.8	20.4	20.5			20	20
100	B	10	10	10																					
100	A	10	10	9			6.90	8.05	8.11			8.6	7.1	7.4					19.7	20.4	20.5			20	20
95	B	10	10	10																					

INIT	LDC	DSB	LDC		
DATE 1997	3/20	3/21	3/22		
TIME	1600	1704	1601		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. Variegatus " "

JRA# 97-3151

GENERAL COMMENTS

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: A-3

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/20/97	0	3/19/97 2000	3/20/97	19.7	6.90	/	8.6	/	1	20	—	—

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	1997 Date	3/20	3/21	3/21	3/22			
Method	Method	Method	Time	1630	1205	1730	1020			
Minutes	Amount	Amount	Init	LDG	LDG	DSB	LDG			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/20/97	0	3/20/97	19.7	7.70	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute To 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250 mL TYPE: Polystyrene VOLUME OF TEST SOLUTION: 200 mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB ~~2~~ 2G @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1046203~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

March 31, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-083
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AC
NPDES Permit #: N/A
PWC #: 664
Sample ID: B-1
JRA ID: 97-3148

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverley E. Blanchard
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-1 JRA #: 97-3148

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	16:00
Test End:	3/22/97	16:02

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	6.89 - 8.09	7.70 - 8.30
	Adjusted	N/A	

JRA #: 97-3148 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (umhos/cm)	N/A	N/A
8. DO (mg/L)	6.8 - 8.6	7.0 - 8.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 95

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3148 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/24/97		
	Result (mg/L)	0.09		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-1 JRA #: 97-3148

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	15:50
Test End:	3/22/97	15:40

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 3 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	6.89 - 8.17	7.70 - 8.28
	Adjusted	N/A	

JRA #: 97-3148 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.7 - 8.6	7.5 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3148 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/24/97		
Result (mg/L)		>40		
QC Range (mg/L)		2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

B-1

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY

Address CIVIL & ENV.TAL ENG. DEPT.
KDH 135 NORFOLK VA 23529-0241

County / Pipe/Outfall/Location /

NPDES# / Instream Waste Conc

Sample collected by (print&sign) yang Affiliation

Type of sample ✓ (Grab): Date 3/19/97 Time 20:00 PM

(Composite): From Date Time

To Date Time

Subsamples comprising composite:

Number B-1, 8Hr. Frequency of collection Volume 2L

*Temperature of sample in sample collection device 28.5°C

Final temperature of effluent at sample collection point

*Is sample collection device chilled? Is sample packed on ice for shipment?

*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)

Is the sample chlorinated? No dechlorinated? If so, how?

Permit with interim chlorine limit? No If yes – limit (mg/L)

Field pH 7.50 Field Total Residual Chlorine

Comments/Sample description B-1, 8 Hr.

Type of test(s) to be performed ACUTE TOXICITY TESTING

(Specify organisms) CYPRINODON VARIEGATUS & MYSID SHRIMP

Method of shipment Reed

Print & Sign Names

1. Relinquished by yang Date 03/19/97 Time 20:00 PM
   Received by [signature] Date 3-20-97 Time Noon
2. Relinquished by [signature] Date 3-20-97 Time 12:20
   Received by [signature] Date 3/20/97 Time 1245

FOR REED LAB USE ONLY

JRA# 97-3148 Arrival Temperature 2.9 On ice? yes

Color tan Odor earthy Solids none

pH 6.48 DO (mg/L) 8.5 Conductivity (µmhos/cm) 1800 @ 19.8°C

Salinity (ppt) 1 TRC (mg/L) – Method –

Rev 5/16/94

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3148

NPDES#: N/A CLIENT: Oceana - OPU OUTFALL: B-1

ORGANISM SOURCE: ABS JRA BATCH#: C205 HATCH DATE: 3/17/97

Conc. % / % Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			7.70	8.28	8.19			7.9	7.5	7.5					19.7	19.3	19.5			20	20
100	B	10	10	10																					
6.25	A	10	10	10			7.43	8.27	8.27			8.1	7.9	8.5					19.8	19.3	19.5			20	20
100	B	10	10	10																					
12.5	A	10	10	10			7.38	8.28	8.28			8.1	7.7	8.6					19.8	19.3	19.5			20	20
100	B	10	10	10																					
25	A	10	10	10			7.21	8.25	8.25			8.2	7.7	8.1					19.8	19.3	19.5			20	20
100	B	10	10	10																					
50	A	10	10	10			7.03	8.20	8.21			8.2	7.7	7.8					19.8	19.3	19.5			20	20
100	B	10	10	10																					
100	A	10	10	10			6.89	8.06	8.17			8.6	7.7	8.5					19.8	19.3	19.5			20	20
100	B	10	10	10																					
INIT		JSB	BB	LKG																					
DATE 1997		3/20	3/21	3/22																					
TIME		1550	1724	1540																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3148

NPDES#: N/A CLIENT: Oceana - Odd OUTFALL: B-1

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M453 HATCH DATE: 3/19-20/97 1500 - 0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	9			7.70	8.27	8.30			7.9	7.0	8.5					19.7	20.4	20.5			20	20
95	B	10	10	10			7.57																		
6.25	A	10	10	10			~~8.18~~	8.18	8.12			8.1	6.8	7.0					19.8	20.4	20.5			20	20
95	B	10	10	9			7.43																		
12.5	A	10	10	10			~~8.~~ 8.05	8.18	8.11			8.1	6.8	6.9					19.8	20.4	20.5			20	20
95	B	10	10	9			7.38																		
25	A	10	10	10			7.21	8.16	8.11			8.2	6.8	6.8					19.8	20.4	20.5			20	20
95	B	10	10	9																					
50	A	10	10	9			7.03	8.12	8.09			8.2	6.7	6.4					19.8	20.4	20.5			20	20
95	B	10	10	10																					
100	A	10	10	9			6.89	8.01	8.09			8.6	6.8	7.2					19.8	20.4	20.5			20	20
95	B	10	10	10																					

INIT	LJG	DSS	LJG		
DATE 1997	3/20	3/21	3/22		
TIME	1600	1700	1602		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

GENERAL COMMENTS

JRA# 97-3148

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: B-1

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/20/97	0	3/19/97 2000	3/20/97	19.8	6.89	✓	8.6	✓	1	20	—	—

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	Date (1997)	3/20	3/21	3/21	3/22			
Method	Method	Method	Time	1630	1205	1730	1020			
Minutes	Amount	Amount	Init	LDG	LDG	DSB	LDG			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/20/97	0	3/20/97	19.7	7.70	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (%/mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (%/mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute To 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250 mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200 mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB & LG @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~10163303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

March 31, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-083
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AC
NPDES Permit #: N/A
PWC #: 665
Sample ID: B-2
JRA ID: 97-3149

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverly E. Blanchard
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-2 JRA #: 97-3149

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	16:00
Test End:	3/22/97	16:05

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	6.89 - 8.17	7.70 - 8.30
	Adjusted	N/A	

JRA #: 97-3149 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.8 - 8.9	7.0 - 8.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3149 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/24/97		
Result (mg/L)		0.09		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-2 JRA #: 97-3149

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	15:50
Test End:	3/22/97	15:43

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 3 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	6.89 - 8.11	7.70 - 8.28
	Adjusted	N/A	

JRA #: 97-3149 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.0 - 8.9	7.5 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3149 Test Type&Organism: Acute (*Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/24/97		
Result (mg/L)		>40		
QC Range (mg/L)		2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

B-2

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY

Address CIVIL & ENV.TAL ENG. DEPT.
KDH 135 NORFOLK VA 23529-0241

County / Pipe/Outfall/Location /

NPDES# / Instream Waste Conc

Sample collected by (print&sign) yang Affiliation

Type of sample ✓ (Grab): Date 3/19/97 Time 20:00 PM

____ (Composite): From Date Time

To Date Time

Subsamples comprising composite:

Number B-2, 8Hr. Frequency of collection Volume 2L.

*Temperature of sample in sample collection device 28.5°C

Final temperature of effluent at sample collection point

*Is sample collection device chilled? Is sample packed on ice for shipment?

*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)

Is the sample chlorinated? No dechlorinated? If so, how?

Permit with interim chlorine limit? No If yes – limit (mg/L)

Field pH 7.47 Field Total Residual Chlorine

Comments/Sample description B-2 8Hr.

Type of test(s) to be performed ACUTE TOXICITY TESTING

(Specify organisms) CYPRINODON VARIEGATUS & MYSID SHRIMP

Method of shipment Reed

Print & Sign Names

1. Relinquished by yang Date 03/19/97 Time 20:00 PM
   Received by [signature] Date 3-20-97 Time Noon
2. Relinquished by [signature] Date 3-20-97 Time 12:20
   Received by [signature] Date 3/20/97 Time 12:45

FOR REED LAB USE ONLY

JRA# 97-3149 Arrival Temperature 2.9 On ice? yes

Color tan Odor earthy Solids none

pH 6.47 DO (mg/L) 8.9 Conductivity (µmhos/cm) 1800 @ 19.8°C

Salinity (ppt) / TRC (mg/L) — Method —

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3149

REED & ASSOCIATES

NPDES#: N/A CLIENT: Ocean - OPU OUTFALL: B-2

ORGANISM SOURCE: ABS JRA BATCH#: C205 HATCH DATE: 3/17/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			7.70	8.28	8.19			7.9	7.5	7.5					19.7	19.3	19.5			20	20
100	B	10	10	10																					
6.25	A	10	10	10			7.49	8.24	8.13			8.0	6.9	7.0					19.8	19.3	19.5			20	20
100	B	10	10	10																					
12.5	A	10	10	10			7.32	8.25	8.14			8.1	6.9	7.1					19.8	19.3	19.5			20	20
100	B	10	10	10																					
25	A	10	10	10			7.21	8.24	8.14			8.1	7.0	7.0					19.8	19.3	19.5			20	20
100	B	10	10	10																					
50	A	10	10	10			7.02	8.18	8.10			8.3	7.0	6.7					19.9	19.3	19.5			20	20
100	B	10	10	10																					
100	A	10	10	9			6.89	8.07	8.11			8.9	7.0	7.3					19.8	19.3	19.5			20	20
95	B	10	10	10																					
INIT		DSB	DSB	LOG																					
DATE 1997		3/20	3/21	3/22																					
TIME		1550	1725	1543																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

:ute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3149

REED & ASSOCIATES

'PDES#: N/A CLIENT: Ocean - ODU OUTFALL: B-2

'RGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M453 HATCH DATE: 3/19-20/97 1500-0800

Conc.(%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			7.70	8.27	8.30			7.9	7.0	8.5					19.7	20.4	20.5			20	20
100	B	10	10	10																					
6.25	A	10	10	10			7.49	8.30	8.27			8.0	7.8	8.4					19.8	20.4	20.5			20	20
100	B	10	10	10																					
12.5	A	10	10	10			7.32	8.30	8.26			8.1	7.7	8.4					19.8	20.4	20.5			20	20
100	B	10	10	10																					
25	A	10	10	10			7.21	8.28	8.25			8.1	7.7	8.2					19.8	20.4	20.5			20	20
100	B	10	10	10																					
50	A	10	10	10			7.02	8.21	8.21			8.3	7.6	7.8					19.9	20.4	20.5			20	20
100	B	10	10	10																					
100	A	10	10	10			6.89	8.10	8.17			8.9	7.8	8.6					19.8	20.4	20.5			20	20
100	B	10	10	10																					
INIT		LAG	[illegible]	LAG																					
DATE 1997		3/20	3/21	3/22																					
TIME		1600	1707	1605																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

GENERAL COMMENTS

JRA# 97-3149

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: B-2

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/20/97	0	3/19/97 2000	3/20/97	19.8	6.89	/	8.9	/	1	20	—	—

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	Date (1997)	3/20	3/21	3/21	3/22			
Method	Method	Method	Time	1630	1205	1730	1020			
Minutes	Amount	Amount	Init	LNG	LNG	DSS	LNG			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/20/97	0	3/20/97	19.7	7.70	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	pH & TRC to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSS

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSS
NUMBER OF ORGANISMS	DSS
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSS

TEST CHAMBER SIZE: 250 mL TYPE: Polystyrene VOLUME OF TEST SOLUTION: 200 mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSS & RG @DSS
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSS ~~Baxter~~ VWR	digi-thermo	@DSS ~~1945303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A0091J23	3811A940230-1	A

COMMENTS:

Rev 3.19.96

March 31, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-083
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AC
NPDES Permit #: N/A
PWC #: 671
Sample ID: B-3
JRA ID: 97-3155

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverly E. Blanchard

Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-3 JRA #: 97-3155

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	16:00
Test End:	3/22/97	16:09

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	6.88 - 8.11	7.70 - 8.30
	Adjusted	N/A	

JRA #: 97-3155 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (umhos/cm)	N/A	N/A
8. DO (mg/L)	7.1 - 8.7	7.0 - 8.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3155 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/24/97		
Result (mg/L)		0.09		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-3 JRA #: 97-3155

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	15:50
Test End:	3/22/97	15:45

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 3 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	6.88 - 8.19	7.70 - 8.28
	Adjusted	N/A	

JRA #: 97-3155 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.7 - 8.7	7.5 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3155 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/24/97		
Result (mg/L)		>40		
QC Range (mg/L)		2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

B-3

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY
Address CIVIL & ENVIRTAL ENG. DEPT.
KDH 135 NORFOLK VA 23529-0241

County / Pipe/Outfall/Location /
NPDES# / Instream Waste Conc
Sample collected by (print&sign) yang Affiliation
Type of sample ✓ (Grab): Date 3/19/97 Time 20:00PM
(Composite): From Date Time
To Date Time

Subsamples comprising composite:
Number B-3, 8Hr. Frequency of collection Volume 2L.

*Temperature of sample in sample collection device 28.5°C
Final temperature of effluent at sample collection point
*Is sample collection device chilled? Is sample packed on ice for shipment?
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? No dechlorinated? If so, how?
Permit with interim chlorine limit? No If yes – limit (mg/L)
Field pH 7.44 Field Total Residual Chlorine
Comments/Sample description B-3, 8Hr.

Type of test(s) to be performed ACUTE TOXICITY TESTING
(Specify organisms) CYPRINODON VARIEGATUS & MYSID SHRIMP
Method of shipment Reed

Print & Sign Names

1. Relinquished by yang Date 03/19/97 Time 20:00 PM
   Received by [signature] Date 3-20-97 Time Noon
2. Relinquished by [signature] Date 3-20-97 Time 12:20
   Received by [signature] Date 3/20/97 Time 1245

FOR REED LAB USE-ONLY

JRA# 97-3155 Arrival Temperature 2.9 On ice? yes
Color tan Odor earthy Solids none
pH 6.49 DO (mg/L) 8.8 Conductivity (µmhos/cm) 1800 @ 19.8 °C
Salinity (ppt) 1 TRC (mg/L) — Method —

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CLIENT INFORMATION

COMPANY/COMMAND: NAS OCEANA CODE:
CONTACT: KIRK, DOUGLAS
PHONE: EXT: FAX:
J.O. #: 1912290
SIGNATURE: ON FILE
PERMIT NO.:

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
000264 000265	664	B-1, 8 HR ODU	START	3/19/97	20.00	G	YANG	L	8	1	BIO ASSAY		97-3148		
	665	B-2 ODU 8 HR	START		20.00								97-3149		
	666	ODU MIX L. RR	START		2000								97-3150		
	667	A-3 8 HR ODU	START		20.00								97-3151		
	668	ODU - A-2 8 HRS	START		20.00								97-3152		
	669	FEEBS. ODU	START	3/19/97	12.00								97-3153		
	670	A-1, 8 HR ODU	START	3/19/97	20.00								97-3154		

TYPE	MATRIX	CONTAINER	PRESERVATIVE
G - GRAB	L - LIQUID / SW - SWIPE	P - PLASTIC / B - BAG / A - AMBER(glass)	1 - COOL TO 4 C / 5 - HCL pH<2
CF - COMPOSITE, FLOW	S - SOLID	GL - GLASS / C - CARTRIDGE	2 - HNO3 pH<2 / 6 - 0.008% Na2S2O3, 4 C
CT - COMPOSITE, TIME	GS - GAS	T - TEFLON / TL - TEFLON LINED LID	3 - H2SO4 pH<2 / 7 - FIELD FILTER
	SS - SEMI SOLID	V - VOA / H - HEXANE RINSED	4 - NaOH pH>12 / 8 - NONE

TURNAROUND (Days): _____ *(FOR RUSH TURNAROUND STATE REASON BELOW)*

COMMENTS:

SAMPLE DISPOSAL: ( )RETURN TO CLIENT ( )DISPOSAL BY LAB

REGULATION APPLIED:

RCRA ( )	HRSD ( )
SDWA ( )	TSCA ( )
CWA ( )	PHOTO ( )
CAA ( )	OTHER ( )

Arrival Temp. 3.2°C

SAMPLING/COLLECTION CHARGE: $
POSSIBLE SAMPLE HAZARDS:
COMMENTS:

D.O. NUMBER: INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).* *
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. – THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM – 3:30 PM).*

FOR LAB USE ONLY — CHECK BOX & INITIAL IF OKAY — SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND: PWC CAB	DATE/TIME: 3/20/97 1240
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND: KAR	DATE/TIME: 3/20/97 1315
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

ENVIRONMENTAL

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

CLIENT INFORMATION

COMPANY/COMMAND: NAS OCEANA CODE:
CONTACT: KIRK DOUGLAS
PHONE: EXT: FAX:
J.O. #: 1912290
SIGNATURE:
PERMIT NO.:

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002B1-1	671	B-3 8 HR	START	3/19/97	21.00	G	YANG	L	8	1	BIOASSAY		97-3155		
0002B5		ODM	STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												

TYPE	MATRIX	CONTAINER	PRESERVATIVE
G - GRAB	L - LIQUID	P - PLASTIC	1 - COOL TO 4 C
CF - COMPOSITE, FLOW	S - SOLID	GL - GLASS	2 - HNO3, pH<2
CT - COMPOSITE, TIME	GS - GAS	T - TEFLON	3 - H2SO4, pH<2
	SS - SEMI SOLID	V - VOA	4 - NaOH, pH>12
	SW - SWIPE	B - BAG	5 - HCL, pH<2
		C - CARTRIDGE	6 - 0.008% Na2S2O3, 4 C
		TL - TEFLON LINED LID	7 - FIELD FILTER
		A - AMBER(glass)	8 - NONE
		H - HEXANE RINSED	

TURNAROUND (Days): _____ *(FOR RUSH TURNAROUND STATE REASON BELOW)*

COMMENTS:

SAMPLE DISPOSAL: ( )RETURN TO CLIENT ( )DISPOSAL BY LAB

REGULATION APPLIED:

RCRA ( ) HRSD ( )
SDWA ( ) TSCA ( )
CWA ( ) PHOTO ( )
CAA ( ) OTHER ( )

Arrival Temp. 3.2°C

SAMPLING/COLLECTION CHARGE: $
POSSIBLE SAMPLE HAZARDS:
COMMENTS:

D.O. NUMBER: INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).**
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. -- THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).*

FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND: PWC CAMB	DATE/TIME: 3/20/97 1240
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND: PWC	DATE/TIME: 3/20/97 1245
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3155

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - ODU OUTFALL: B-3

ORGANISM SOURCE: ABS JRA BATCH#: C205 HATCH DATE: 3/17/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	24	48		0		24	48		0		24	48				0	24	48			0	END
0	A	10	10	10	10		7.70		8.28	8.19		7.9		7.5	7.5				19.7	19.3	19.5			20	20
100	B	10	10	10	10																				
6.25	A	10	10	10	9		7.48	5.05	8.26	8.27		8.0	7.2	7.5	8.5				19.8	19.3	19.5			20	20
90	B	10	10	10	9																				
12.5	A	10	9	10	8 (DOC)		7.32	5.02	8.26	8.27		8.1	7.1	7.5	8.3				19.8	19.3	19.5			20	20
95	B	10	10	10	9																				
25	A	10	9	10	10		7.21	5.03	8.24	8.23		8.1	7.0	7.6	8.3				19.9	19.3	19.5			20	20
100	B	10	10	10	10																				
50	A	10	9	10	10		7.08	5.01	8.20	8.20		8.2	7.0	7.6	7.9				19.9	19.3	19.5			20	20
100	B	10	9	10	10																				
100	A	10	10	10	10		6.88	4.88	8.10	8.19		8.7	5.9	7.7	8.0				19.8	19.3	19.5			20	20
95	B	10	9 (DOC)	10	9			(pH)					(DOC)												
INIT		DS	DS	DS	LAG																				
DATE 19 97		3/20	3/20	3/21	3/22																				
TIME		1550	1729 (DS)	1717	1545																				

* pH probe malfunctioning - replaced

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

cute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3155

NPDES#: N/A CLIENT: Oceana - Ocd OUTFALL: B.3

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M453 HATCH DATE: 3/19-20/97 1500-0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%) 0	24	48			pH (Day 0: 6.0 - 9.0) 0	24	48			DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C) 0	24	48					TEMPERATURE (19 - 21°C) 0	24	48			SALINITY (19 - 21ppt) 0	END
HOURS⇒																									
0	A	10	10	10			7.70	8.27	8.30			7.9	7.0	8.5					19.7	20.4	20.5			20	20
100	B	10	10	10									7.0												
6.25	A	10	10	10			7.48	8.26	8.10			8.0	7.2	7.0					19.8	20.4	20.5			20	20
100	B	10	10	10																					
12.5	A	10	9	9			7.32	8.24	8.10			8.1	6.9	7.0					19.8	20.4	20.5			20	20
90	B	10	10	9																					
25	A	10	9	9			7.21	8.21	8.08			8.1	6.9	6.9					19.9	20.4	20.5			20	20
90	B	10	10	9																					
50	A	10	9	9			7.08	8.18	8.11			8.2	7.0	7.0					19.9	20.4	20.5			20	20
80	B	10	9	7																					
100	A	10	10	9			6.88	8.10	8.11			8.7	7.1	7.2					19.8	20.4	20.5			20	20
90	B	10	9	9																					
INIT		LOG	DDS	LOG																					
DATE 1997		3/20	3/21	3/22																					
TIME		1600	1709	1609																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

GENERAL COMMENTS

JRA# 97-3155

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana Oil OUTFALL: B.3

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/20/97	0	3/19/97 2000	3/20/97	19.8	688	/	8.7	/	1	20	—	—

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date				1997 Date	3/20	3/21	3/21	3/22		
Method				Time	1630	1205	1730	1020		
Minutes	Amount	Amount		Init	LDG	LDG	DJJ	LDG		

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/20/97	0	3/20/97	19.7	770	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute To 1000
6.25	↓	↓	62.5	↓
12.5	↓	↓	125	↓
25	↓	↓	250	↓
50	↓	↓	500	↓
100	↓	↓	1000	0

CALCULATIONS PERFORMED BY: DJJ

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DJJ
NUMBER OF ORGANISMS	DJJ
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DJJ

TEST CHAMBER SIZE: 250 mL TYPE: Polystyrene VOLUME OF TEST SOLUTION: 200 mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DJJ & RG @DJJ
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DJJ ~~Baxter~~ VWR	digi-thermo	@DJJ ~~W46203~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A0091/23	8811A940230-1	A

COMMENTS:

Rev 3.19.96

March 31, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-083
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AC
NPDES Permit #: N/A
PWC #: 669
Sample ID: Feed S.
JRA ID: 97-3153

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverly E. Blanchard
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Feed S. JRA #: 97-3153

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	16:00
Test End:	3/22/97	15:49

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): All vessels from test initiation

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	6.73	7.70 - 8.30
	Adjusted	N/A	

JRA #: 97-3153 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	0.2 - 8.8	7.0 - 8.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: Spearman-Karber
Growth/Reproduction: N/A

JRA #: 97-3153 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		19.5%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/24/97		
Result (mg/L)		0.09		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Feed S. JRA #: 97-3153

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	15:50
Test End:	3/22/97	15:30

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 3 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): All vessels from test initiation

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	6.73 - 8.34	7.70 - 8.28
	Adjusted	N/A	

JRA #: 97-3153 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (umhos/cm)	N/A	N/A
8. DO (mg/L)	2.1 - 8.8	7.5 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: Spearman-Karber
Growth/Reproduction: N/A

JRA #: 97-3153 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		35%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/24/97		
	Result (mg/L)	>40		
	QC Range (mg/L)	2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

Feed S.

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	<6.25	31		
2/28/97	Invalid	35		
3/12/97	17.7	52		
3/20/97	19.5	35		

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY
Address CIVIL & ENV.TAL ENG. DEPT.
KDH 135 NORFOLK VA 23529-0241

County ✓ Pipe/Outfall/Location ✓
NPDES# ✓ Instream Waste Conc _____
Sample collected by (print&sign) Yang Affiliation _____
Type of sample ✓ (Grab): Date 3/19/97 Time 20:00 PM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number Feed S. Frequency of collection _____ Volume 2 L

*Temperature of sample in sample collection device 26.0°C
Final temperature of effluent at sample collection point _____
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
***It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)**
Is the sample chlorinated? No dechlorinated? _____ If so, how? _____
Permit with interim chlorine limit? No If yes – limit (mg/L) _____
Field pH ~~[illegible]~~ 6.12 Field Total Residual Chlorine _____
Comments/Sample description Feed S.

Type of test(s) to be performed ACUTE TOXICITY TESTING
(Specify organisms) CYPRINODON VARIEGATUS & MYSID SHRIMP
Method of shipment Reed

Print & Sign Names

1. Relinquished by Yang Date 03/19/97 Time 12:00 PM
   Received by [signature] Date 3-20-97 Time Noon
2. Relinquished by [signature] Date 3-20-97 Time 12:20
   Received by [signature] Date 3/20/97 Time 12:45

FOR REED LAB USE ONLY

JRA# 97-3153 Arrival Temperature 2.9 On ice? yes
Color tan Odor yeast Solids none
pH 6.55 DO (mg/L) 8.9 Conductivity (µmhos/cm) 1600 @ 19.3 °C
Salinity (ppt) 1 TRC (mg/L) — Method —

Rev 5/16/94

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3153

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - ODU OUTFALL: Feed S

ORGANISM SOURCE: ABS JRA BATCH#: C205 HATCH DATE: 3/17/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%) 0	24	48			pH (Day 0: 6.0 - 9.0) 0	24	48			DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C) 0	24	48					TEMPERATURE (19 - 21°C) 0	24	48			SALINITY (19 - 21ppt) 0	END
HOURS⇒																									
0	A	10	10	10			7.70	8.28	8.19			7.9	7.5	7.5					19.7	19.3	19.5			20	20
100	B	10	10	10																					
6.25	A	10	10	10			7.68	~~4.98~~	8.26			8.0	6.8	8.0					19.7	19.3	19.5			20	20
100	B	10	10	10																					
12.5	A	10	10	10			7.59	~~5.08~~	~~8.29~~			8.0	7.5	8.2					19.6	19.3	19.5			20	20
100	B	10	10	10																					
25	A	10	10	9			7.42	~~4.98~~	~~8.06~~			8.1	7.1	5.8					19.6	19.3	19.5			20	20
95	B	10	10	10																					
50	A	10	10	1			7.10	~~4.88~~	~~8.06~~ 8.39	aux		8.3	6.6	~~5.9~~ 7.1	aux				19.5	19.3	19.5			20	20
5	B	10	10	0																					
100	A	10	1	0			6.73	~~4.88~~	8.31			8.8	2.1	6.7					19.3	19.3	19.5			20	20
0	B	10	9	0				ABS																	
INIT		DBS	LDC	LDC																					
DATE 1997		3/20	3/21	3/22																					
TIME		1550	1610	1530																					

* pH probe malfunctioning - replaced

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

LC50 = 35%

TRIMMED SPEARMAN-KARBER METHOD. VERSION 1.5

DATE: 3/20/97 TEST NUMBER: 97-3153 , DURATION: 48 hours
TOXICANT : Feed S.
SPECIES: C. variegatus

RAW DATA: Concentration (%)	Number Exposed	Mortalities
.00	20	0
6.25	20	0
12.50	20	0
25.00	20	1
50.00	20	19
100.00	20	20

SPEARMAN-KARBER TRIM: .00%

SPEARMAN-KARBER ESTIMATES: LC50: 35.36
95% LOWER CONFIDENCE: 32.13
95% UPPER CONFIDENCE: 38.90

---

ute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3153

REED & ASSOCIATES

PDES#: N/A CLIENT: Oceana - ODU OUTFALL: Feed S

RGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M453 HATCH DATE: 3/19-20/97 1500-0800

Conc (%) / % Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			7.70	8.27	8.30			7.9	7.0	8.5					19.7	20.4	20.5			20	20
100	B	10	10	10																					
6.25	A	10	9	9			7.68	5.12	8.10			8.0	7.1	8.1					19.7	20.4	20.5			20	20
90	B	10	10	9																					
12.5	A	10	9	8			7.59	5.08	8.26			8.0	7.2	7.9					19.6	20.4	20.5			20	20
80	B	10	9	8																					
25	A	10	9*	–			7.42	5.17	8.30			8.1	7.4	7.9					19.6	20.4	20.5			20	20
35	B	10	9	7																					
50	A	10	0	–			7.10	4.79	–			8.3	0.4	–					19.5	20.4	~~20.5~~ (20.5)			20	20
0	B	10	0	–																					
100	A	10	0	–			6.73	4.84 (END)	–			8.8	0.2	–					19.3	20.4	~~20.5~~ (20.5)			20	20
0	B	10	0	–																					
INIT		3/20	3/21	3/22																					
DATE 1997		LOG	LOG	LOG																					
TIME		1600	1555	1549																					

* pH probe malfunctioning - replaced

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

TRIMMED SPEARMAN-KARBER METHOD. VERSION 1.5

LC50 = 19.5%

DATE: 3/20/97 TEST NUMBER: 97-3153 DURATION: 48 hours
TOXICANT : Feed S.
SPECIES: M. bahia

RAW DATA: Concentration (%)	Number Exposed	Mortalities
.00	20	0
6.25	20	2
12.50	20	4
25.00	20	13
50.00	20	20
100.00	20	20

SPEARMAN-KARBER TRIM: 10.00%

SPEARMAN-KARBER ESTIMATES: LC50: 19.52
95% LOWER CONFIDENCE: 15.31
95% UPPER CONFIDENCE: 24.88

Acute *Mysidopsis bahia* Toxicity Test
" C. Variegatus " "

JRA# 97-3153

GENERAL COMMENTS

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: Feeds

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/20/97	0	3/19/97 2000	3/20/97	19.3	6.73	/	8.8	/	1	20	—	—

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	1997 Date	3/20	3/21	3/21	3/22			
Method	Method	Method	Time	1630	1205	1730	1020			
Minutes	Amount	Amount	Init	LDG	LDG	DSB	LDG			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/20/97	0	3/20/97	19.7	7.70	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute To 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	DSB

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250 mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200 mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB ~~E~~ ~~E~~G @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1046203~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS: Aeration pump shut off over night for 25% rep. A

Rev 3/19/96

March 31, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-083
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AC
NPDES Permit #: N/A
PWC #: 666
Sample ID: Mix L. R.R.
JRA ID: 97-3150

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverly E. Blanchard
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Mix L. R.R. JRA #: 97-3150

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	16:00
Test End:	3/22/97	15:52

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	21	
3. pH	Initial	7.27 - 8.22	7.70 - 8.30
	Adjusted	N/A	

JRA #: 97-3150 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.1 - 9.0	7.0 - 8.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3150 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/24/97		
Result (mg/L)		0.09		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Mix L. R.R. JRA #: 97-3150

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/20/97	15:50
Test End:	3/22/97	15:32

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 3 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	21	
3. pH	Initial	7.27 - 8.16	7.70 - 8.28
	Adjusted	N/A	

JRA #: 97-3150 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.5 - 9.0	7.5 - 7.9

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3150 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/24/97		
	Result (mg/L)	>40		
	QC Range (mg/L)	2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

Mix L. R.R.

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY
Address CIVIL & ENV.TAL ENG. DEPT.
KDH 135 NORFOLK VA 23529-0241

County / Pipe/Outfall/Location /
NPDES# / Instream Waste Conc
Sample collected by (print&sign) yang Affiliation
Type of sample ✓ (Grab): Date 3/19/97 Time 20:00 PM
(Composite): From Date Time
To Date Time

Subsamples comprising composite:
Number Mix. L. RR Frequency of collection Volume 2L

*Temperature of sample in sample collection device 23.0°C
Final temperature of effluent at sample collection point
*Is sample collection device chilled? Is sample packed on ice for shipment?
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? No dechlorinated? If so, how?
Permit with interim chlorine limit? No. If yes – limit (mg/L)
Field pH 7.51 Field Total Residual Chlorine
Comments/Sample description Mix L. RR

Type of test(s) to be performed ACUTE TOXICITY TESTING
(Specify organisms) CYPRINODON VARIEGATUS & MYSID SHRIMP
Method of shipment Reed

Print & Sign Names

1. Relinquished by yang Date 03/19/97 Time 20:12 PM
Received by [signature] Date 3-20-97 Time Noon
2. Relinquished by [signature] Date 3-20-97 Time 12:20
Received by [signature] Date 3/20/97 Time 1245
See PWC COC

FOR REED LAB USE ONLY

JRA# 97-3150 Arrival Temperature 2.9 On ice? yes
Color tan Odor earthy Solids none
pH 6.94 DO (mg/L) 9.0 Conductivity (µmhos/cm) 1900 @ 19.7°C
Salinity (ppt) 1 TRC (mg/L) — Method —

Rev 5/25/94

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3150

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana - ODU OUTFALL: Mix L

ORGANISM SOURCE: ABS JRA BATCH#: C205 HATCH DATE: 3/17/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			7.70	8.28	8.19			7.9	7.5	7.5					19.7	19.3	19.5			20	20
100	B	10	10	10																					
6.25	A	10	10	10			7.68	8.28	8.14			8.0	7.6	7.0					19.8	19.3	19.5			20	20
100	B	10	10	10																					
12.5	A	10	10	10			7.62	8.28	8.18			8.1	7.8	7.2					19.8	19.3	19.5			20	20
100	B	10	10	10																					
25	A	10	10	10			7.51	8.28	8.20			8.2	7.6	7.1					19.8	19.3	19.5			20	20
100	B	10	10	10																					
50	A	10	10	10			7.43	8.26	8.20			8.4	7.7	7.1					19.9	19.3	19.5			20	20
100	B	10	10	10																					
100	A	10	10	10			7.27	8.11	4.16			9.0	7.8	7.5					19.7	19.3	19.5			21	21
100	B	10	10	10																					

INIT		DSB	DSB	LDG	
DATE 1997		3/20	3/21	3/22	
TIME		1550	1711	1532	

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

ute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-350

REED & ASSOCIATES

PDES#: N/A CLIENT: Oceana - ODU OUTFALL: Mix L.

RGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M453 HATCH DATE: 3/19-20/97 1500-0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			7.70	8.27	8.30			7.9	7.0	8.5					19.7	20.4	20.5			20	20
100	B	10	10	10																					
6.25	A	10	10	10			7.68	8.23	8.30			8.0	6.8 7.2	8.6					19.8	20.4	20.5			20	20
100	B	10	10	10																					
12.5	A	10	10	10			7.62	8.24	8.31			8.1	6.9 7.1	8.6					19.8	20.4	20.5			20	20
100	B	10	10	10																					
25	A	10	10	10			7.51	8.23	8.31			8.2	6.9 7.0	8.6					19.8	20.4	20.5			20	20
100	B	10	10	10																					
50	A	10	10	10			7.43	8.21	8.29			8.4	7.0 7.0	8.6					19.9	20.4	20.5			20	20
100	B	10	10	10																					
100	A	10	10	10			7.27	8.11	8.22			9.0 7.1	5.9 ALG.	8.4					19.7	20.4	20.5			21	21
100	B	10	10	10																					
INIT		LDG	BBS	LDG																					
DATE 1997		3/20	3/21	3/22																					
TIME		1600	1653	1552																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. Variegatus " "

GENERAL COMMENTS

JRA# 97-3150

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: Mix L

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/20/97	0	3/19/97 2000	3/20/97	19.7	7.27	/	9.0	/	1	21	—	—

DO Adj.	pH Adj.	TRC Adj.	Feedings (Mysid) 1997							
Date	Date	Date	Date	3/20	3/21	3/21	3/22			
Method	Method	Method	Time	1630	1205	1730	1020			
Minutes	Amount	Amount	Init	LDG	LDG	DSB	LDG			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/20/97	0	3/20/97	19.7	7.70	7.9	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute To 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250 mL TYPE: Polystyrene VOLUME OF TEST SOLUTION: 200 mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB ~~2~~ ~~2~~ G @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1046203~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev. 2/19/96

ACUTE TOXICITY TEST RESULTS

50 ppm AFFF

FEBRAURY 11, 1997

February 20, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0227-068
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 576
Sample ID: A-1
JRA ID: 97-1622

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Clarkson
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-1 JRA #: 97-1622

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:35
Test End:	2/14/97	15:45

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.00 - 8.10	8.03 - 8.66
	Adjusted	N/A	

JRA #: 97-1622 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	5.0 - 8.3	6.4 - 7.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1622 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		2/11/97		
	Result (mg/L)	0.15		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-1 JRA #: 97-1622

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:35
Test End:	2/14/97	16:52

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 6 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.10 - 8.13	8.30 - 8.66
	Adjusted	N/A	

JRA #: 97-1622 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.1 - 8.3	7.5 - 8.4

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1622 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		2/18/97		
Result (mg/L)		27		
QC Range (mg/L)		0	thru	34

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

A-1

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CLIENT INFORMATION

COMPANY/COMMAND: OCEANA, NAS CODE:
CONTACT: Douglas Kirk
PHONE: 433-3439 EXT: FAX:
J.O. #: 1912290
SIGNATURE:
PERMIT NO.:

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002BH 0002BS	571	B-3	START / STOP	2/11/97	0700 PM	G	HY	L	1	1	TOXICITIES MD/CU		97-1617		4°C
	572	B-2	START / STOP	2/11/97	0700 PM								97-1618		
	573	B-1	START / STOP	2/11/97	0700 PM								97-1619		
	574	A-3	START / STOP	2/11/97	0700 PM								97-1620		
	575	A-2	START / STOP	2/11/97	0700 PM								97-1621		
	576	A-1	START / STOP	2/11/97	0700 PM								97-1622		
	577	MIXED L & R.R.	START / STOP	2/11/97	1100 AM	G	HY	L	1	1			97-1623		

TYPE	MATRIX	CONTAINER	PRESERVATIVE
G - GRAB	L - LIQUID SW - SWIPE	P - PLASTIC B - BAG A - AMBER(glass)	1 - COOL TO 4 C 5 - HCL, pH<2
CF - COMPOSITE, FLOW	S - SOLID	GL - GLASS C - CARTRIDGE	2 - HNO3, pH<2 6 - 0.008% Na2S2O3, 4 C
CT - COMPOSITE, TIME	GS - GAS	T - TEFLON TL - TEFLON LINED LID	3 - H2SO4, pH<2 7 - FIELD FILTER
	SS - SEMI SOLID	V - VOA H - HEXANE RINSED	4 - NaOH, pH>12 8 - NONE

TURNAROUND (Days): _____ (FOR RUSH TURNAROUND STATE REASON BELOW)

COMMENTS:

REGULATION APPLIED:
RCRA ( ) HRSD ( )
SDWA ( ) TSCA ( )
CWA ( ) PHOTO ( )
CAA ( ) OTHER ( )

SAMPLING/COLLECTION CHARGE: $
POSSIBLE SAMPLE HAZARDS:
COMMENTS:

SAMPLE DISPOSAL: ( )RETURN TO CLIENT ( )DISPOSAL BY LAB

Arrival Temp. 2.6°C DSB

D.O. NUMBER: 227/067 INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).*
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. SAMPLES RECEIVED AFTER 2:00 PM MON. -- THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: [signature]	DATE/TIME: 2/12/97 1330
RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: [signature]	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CONTINUATION SHEET

SHEET 2 OF 2

P.O.C.: Douglas Kirk
COMMAND: Oceana NAS

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002B1T 0002B5	578	Feeds	START / STOP	2/11/97	11:00 AM	G	HY	L	1	1	TOXICITY mL/CV		97.1624		4°C ab
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												

COMMENTS:

Arrival Temp. 2.0°C ISB

D.O. NUMBER:
CONTRACT LAB:
CONTRACT NO.(S):
INIT.:
DATE:
OFFICIAL USE ONLY

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).**
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. – THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).*

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: BtS Inc	DATE/TIME: 2/12/97 1330
RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: [illegible]	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

#576

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY
Address DEPT. OF CIVIL & ENVIRONMENTAL ENG.
KDH 135 NORFOLK VA 23529-0241

County _____ Pipe/Outfall/Location _____
NPDES# _____ Instream Waste Conc _____
Sample collected by (print&sign) _____ Affiliation _____
Type of sample ✓ (Grab): Date 2/11/97 Time ~~11:00 AM~~ 7:00 PM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number A-1 8 Hr. Frequency of collection _____ Volume 2 L.
*Temperature of sample in sample collection device 22.0°C
Final temperature of effluent at sample collection point 22.0°C
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? NA dechlorinated? _____ If so, how? _____
Permit with interim chlorine limit? _____ If yes – limit (mg/L) _____
Field pH 7.40 Field Total Residual Chlorine NA
Comments/Sample description _____

Type of test(s) to be performed MYSID & CYPRINODON ACUTE LC50
(Specify organisms) SHRIMP VARIEGATUS
Method of shipment bayside

Print & Sign Names

1. Relinquished by H. YANG Date 2/12/97 Time 9:00 AM
Received by [signature] Date 2-12-97 Time 10:00 A.M.
2. Relinquished by [signature] Date 2-12-97 Time 10:15 A.M.
Received by [signature] Date 2-12-97 Time 10:15 AM.
relinq. by [signature] 2-12-97 1405
rcd by [signature] 2/12/97 1405

FOR REED LAB USE ONLY

JRA# 97-1622 Arrival Temperature 2.0°C On ice? yes
Color tan Odor earthy Solids none
pH 7.74 DO (mg/L) 7.8 Conductivity (µmhos/cm) 1800 @ 19.9 °C
Salinity (ppt) 1 TRC (mg/L) N/A Method N/A

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-1622

NPDES#: N/A CLIENT: Occma ODU OUTFALL: 6 A-1

ORGANISM SOURCE: ABS JRA BATCH#: C202 HATCH DATE: 2/6/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.66	8.42	8.30			7.5	7.7	8.4					20.3	19.5	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.61	8.38	8.19			7.7	7.5	7.5					20.4	19.5	20.6			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.52	8.40	8.24			7.8	7.4	7.2					20.4	19.5	20.6			20	20
100	B	10	10	10																					
25	A	10	10	10			8.44	8.35	8.21			8.0	7.2	6.8					20.3	19.5	20.6			20	20
100	B	10	10	10																					
50	A	10	10	10			8.32	8.26	8.19			8.1	7.1	7.0					20.2	19.5	20.6			20	20
100	B	10	10	10																					
100	A	10	10	10			8.10	8.10	8.13			8.3	7.1	7.1					19.9	19.5	20.6			20	20
100	B	10	10	10																					
INIT		DSS	LDG	LDG																					
DATE 1997		2/12	2/13	2/14																					
TIME		1635	1625	1552																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

:ute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-1622

REED & ASSOCIATES

PDES#: NA CLIENT: Ocean ODU OUTFALL: 6 A-1

RGANISM SOURCE: ABS JRA BATCH#: 1442 HATCH DATE: 2/8/97

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.66	8.31	8.03			7.5	6.4	6.5					20.3	20.0	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.61	8.27	7.90			7.7	6.3	4.9					20.4	20.0	20.6			20	20
95	B	10	9	9																					
12.5	A	10	10	10			8.52	8.28	7.95			7.8	6.0	4.1					20.4	20.0	20.6			20	20
100	B	10	10	10																					
25	A	10	10	10			8.44	8.27	8.04			8.0	5.8	4.8					20.3	20.0	20.6			20	20
100	B	10	10	10																					
50	A	10	10	10			8.32	8.20	8.09			8.1	6.0	5.1					20.2	20.0	20.6			20	20
100	B	10	10	10																					
100	A	10	10	10			8.10	8.01	8.00			8.3	5.9	5.0					19.9	20.0	20.6			20	20
95	B	10	9	9																					

INIT		DS	LDG	DS	
DATE 1997		2/12	2/13	2/14	
TIME		1635	1548	~~1645~~ 1545	

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" *C. variegatus* " "

GENERAL COMMENTS

JRA# 97-1622

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana SDU OUTFALL: 6 A-1

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
2/12/97	0	2/11/97 1900	2/12/97	19.9	8.10	/	8.3	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid) 1997

Date				Date 2/12	2/13	2/13	2/14
Method				Time 1718	0850	1645	0859
Minutes	Amount	Amount		Init LDG	LDG	LDG	LDG

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
2/12/97	0	2/12/97	20.3	8.66	7.5	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute to 1000
6.25			62.5	
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DB
NUMBER OF ORGANISMS	DB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DB

TEST CHAMBER SIZE: 250mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	2 26
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	~~Baxter~~ VWR	digi-thermo	~~1946303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

February 20, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0227-068
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 575
Sample ID: A-2
JRA ID: 97-1621

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Claiborne
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-2 JRA #: 97-1621

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:30
Test End:	2/14/97	15:42

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.01 - 8.14	8.03 - 8.66
	Adjusted	N/A	

JRA #: 97-1621 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	4.7 - 8.2	6.4 - 7.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1621 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		2/11/97		
	Result (mg/L)	0.15		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-2 JRA #: 97-1621

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:30
Test End:	2/14/97	16:45

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 6 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.12 - 8.15	8.30 - 8.66
	Adjusted	N/A	

JRA #: 97-1621 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.5 - 8.2	7.5 - 8.4

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1621 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)	_____	(LOEC)	_____
Normal Distribution (yes/no)		_____		
Homogeneous Variance (yes/no)		_____		
Growth or Reproduction	(NOEC)	_____	(LOEC)	_____
Normal Distribution (yes/no)		_____		
Homogeneous Variance (yes/no)		_____		
Reference Toxicant Test Date		2/18/97		
Result (mg/L)		27		
QC Range (mg/L)		0	thru	34

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

_____

_____

_____

_____

_____

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

A-2

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CLIENT INFORMATION

COMPANY/COMMAND: OCEANA, NAS CODE:
CONTACT: Douglas Kirk
PHONE: 433-3439 EXT: FAX:
J.O. #: 1912290
SIGNATURE:
PERMIT NO.:

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002B1+ 0002B5	571	B-3	START / STOP	2/11/97	0700 PM	G	HY	L	1	1	TOXICITIES MD/CV		97-1617		4°C
	572	B-2	START / STOP	2/11/97	0700 PM								97-1618		
	573	B-1	START / STOP	2/11/97	0700 PM								97-1619		
	574	A-3	START / STOP	2/11/97	0700 PM								97-1620		
	575	A-2	START / STOP	2/11/97	0700 PM								97-1621		
	576	A-1	START / STOP	2/11/97	0700 PM								97-1622		
	577	MIXED L & R R.	START / STOP	2/11/97	1100 AM	G	HY	L	1	1			97-1623		

TYPE	MATRIX	CONTAINER	PRESERVATIVE
G - GRAB	L - LIQUID SW - SWIPE	P - PLASTIC B - BAG A - AMBER(glass)	1 - COOL TO 4 C 5 - HCL, pH<2
CF - COMPOSITE, FLOW	S - SOLID	GL - GLASS C - CARTRIDGE	2 - HNO3, pH<2 6 - 0.008% Na2S2O3, 4 C
CT - COMPOSITE, TIME	GS - GAS	T - TEFLON TL - TEFLON LINED LID	3 - H2SO4, pH<2 7 - FIELD FILTER
	SS - SEMI SOLID	V - VOA H - HEXANE RINSED	4 - NaOH, pH>12 8 - NONE

TURNAROUND (Days): _____ (FOR RUSH TURNAROUND STATE REASON BELOW)

COMMENTS:

REGULATION APPLIED:
RCRA ( ) HRSD ( )
SDWA ( ) TSCA ( )
CWA ( ) PHOTO ( )
CAA ( ) OTHER ( )

SAMPLING/COLLECTION CHARGE: $
POSSIBLE SAMPLE HAZARDS:
COMMENTS:

SAMPLE DISPOSAL: ( )RETURN TO CLIENT ( )DISPOSAL BY LAB

Arrival Temp. 2.6°C DSB

D.O. NUMBER: 227/067 INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).*
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. SAMPLES RECEIVED AFTER 2:00 PM MON. – THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM – 3:30 PM).

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: [signature]	DATE/TIME: 2/12/97 1330
RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: [signature]	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CONTINUATION SHEET

SHEET 2 OF 2

P.O.C.: Douglas Kirk
COMMAND: Oceana NAS

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002B(1	578	Feeds	START	2/11/97	11:00	G	HY	L	1	1	TOXICITY		97-1624		4°C
0002B5			STOP		AM						m/c				
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												

COMMENTS: Arrival Temp. 2.0°C

D.O. NUMBER:
CONTRACT LAB:
CONTRACT NO.(S):
OFFICIAL USE ONLY
INIT.:
DATE:

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).**
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. -- THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).*

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: Gayle Goodwin	REC'D BY: D Hamill	COMPANY/COMMAND: BES Inc	DATE/TIME: 2/12/97 1330
RELINQUISHED BY: D Hamill	REC'D BY: [illegible]	COMPANY/COMMAND: [illegible]	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

#575

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY
Address DEPT. OF CIVIL & ENVIRONMENTAL ENG.
KDH 135 NORFOLK VA 23529-0241

County _____ Pipe/Outfall/Location _____
NPDES# _____ Instream Waste Conc _____
Sample collected by (print&sign) _____ Affiliation _____
Type of sample ✓ (Grab): Date 2/11/97 Time 7:00 PM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number A-2 8 Hr. Frequency of collection _____ Volume _____

*Temperature of sample in sample collection device 22.0°C
Final temperature of effluent at sample collection point _____
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? NA dechlorinated? _____ If so, how? _____
Permit with interim chlorine limit? _____ If yes – limit (mg/L) _____
Field pH 7.35 Field Total Residual Chlorine NA
Comments/Sample description _____

Type of test(s) to be performed MYSID SHRIMP & CYPRINODON VARIEGATUS ACUTE LC50
(Specify organisms)
Method of shipment Bayside

Print & Sign Names

1. Relinquished by H. YANG Date 2/12 197 Time 9:00 AM
   Received by [signature] Date 2-12-97 Time 10:00 A.M.
2. Relinquished by [signature] Date 2-12-97 Time 10:15
   Received by [signature] Date 2-12-97 Time 10:15
   Relinq. by R Daniel 2-12-97 1405
   Rec'd by [signature] 2/12/97 1405

FOR REED LAB USE ONLY

JRA# 97-1621 Arrival Temperature 2.0°C On ice? yes
Color tan Odor earthy Solids none
pH 7.71 DO (mg/L) 7.7 Conductivity (µmhos/cm) 1800 @ 19.9 °C
Salinity (ppt) 1 TRC (mg/L) N/A Method N/A

ute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-1621

REED & ASSOCIATES

PDES#: N/A CLIENT: Ocean SDU OUTFALL: 5 A-2

RGANISM SOURCE: ABS JRA BATCH#: C202 HATCH DATE: 2/6/97

Conc % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.66	8.42	8.30			7.5	7.7	8.4					20.3	19.5	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.61	8.38	8.22			7.6	7.7	8.1					20.3	19.5	20.6			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.57	8.36	8.21			7.7	7.7	7.8					20.3	19.5	20.6			20	20
100	B	10	10	10																					
25	A	10	9	9			8.45	8.35	8.26			7.9	7.6	7.7					20.3	19.5	20.6			20	20
100	B	10	10	10																					
50	A	10	10	10			8.38	8.28	8.23			8.0	7.5	7.5					20.2	19.5	20.6			20	20
100	B	10	10	10																					
100	A	10	10	10			8.14	8.12	8.15			8.2	7.5	7.5					19.9	19.5	20.6			20	20
100	B	10	10	10																					

INIT		DS	LDG	LDG	
DATE 1997		2/12	2/13	2/14	
TIME		1630	1614	1545	

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

ite *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 47.1621

REED & ASSOCIATES

'DES#: N/A CLIENT: Oceana EDU OUTFALL: 5 A-2

RGANISM SOURCE: ABS JRA BATCH#: M442 HATCH DATE: 2/8/97

onc (%) / Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.66	8.31	8.03			7.5	6.4	6.5					20.3	20.0	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.61	8.30	7.99			7.6	6.4	6.1					20.3	20.0	20.6			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.57	8.32	8.03			7.7	6.1	4.0					20.3	20.0	20.6			20	20
100	B	10	10	10																					
25	A	10	10	10			8.45	8.32	8.06			7.9	6.1	4.1					20.3	20.0	20.6			20	20
100	B	10	10	10																					
50	A	10	10	10			8.38	8.23	8.08			8.0	6.2	4.6					20.2	20.0	20.6			20	20
100	B	10	10	10																					
100	A	10	10	10			8.14	8.06	8.01			8.2	6.3	4.7					19.9	20.0	20.6			20	20
95	B	10	9	9																					

INIT	DSB	LDG	DSB		
DATE 1997	2/12	2/13	2/14		
TIME	1630	1542	1542		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

GENERAL COMMENTS

JRA# 97-1621

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: 5 A2

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
2/12/97	0	2/11/97 1900	2/12/97	19.9	8.14	/	8.2	/	1	20	/	/

DO Adj.	pH Adj.	TRC Adj.	Feedings (Mysid)							
Date	Date	Date	1997 Date	2/12	2/13	2/13	2/14			
Method	Method	Method	Time	1718	0850	1645	0859			
Minutes	Amount	Amount	Init	LDG	LDG	LDG	LDG			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
2/12/97	0	2/12/97	20.3	8.66	7.5	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute To 1000
6.25	↓	↓	62.5	↓
12.5	↓	↓	125	↓
25	↓	↓	250	↓
50	↓	↓	500	↓
100	↓	↓	1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB ~~2~~ 2G @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1946303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

February 20, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0227-068
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 574
Sample ID: A-3
JRA ID: 97-1620

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Clarlone
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-3 JRA #: 97-1620

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:25
Test End:	2/14/97	15:40

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	21	
3. pH	Initial	8.03 - 8.10	8.03 - 8.66
	Adjusted	N/A	

JRA #: 97-1620 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	4.6 - 8.2	6.4 - 7.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1620 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		2/11/97		
	Result (mg/L)	0.15		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-3 JRA #: 97-1620

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:25
Test End:	2/14/97	16:22

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 6 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	21	
3. pH	Initial	8.10 - 8.18	8.30 - 8.66
	Adjusted	N/A	

JRA #: 97-1620 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.5 - 8.2	7.5 - 8.4

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1620 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		2/18/97		
	Result (mg/L)	27		
	QC Range (mg/L)	0	thru	34

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

A-3

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CLIENT INFORMATION

COMPANY/COMMAND: OCEANA NAS CODE:
CONTACT: Douglas Kirk
PHONE: 433-3439 EXT: FAX:
J.O. #: 1912290
SIGNATURE:
PERMIT NO.:

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002BH 0002BS	571	B-3	START / STOP	2/11/97	0700 PM	G	HY	L	1	1	TOXICITIES MD/CV		97-1617		4°C
	572	B-2	START / STOP	2/11/97	0700 PM								97-1618		
	573	B-1	START / STOP	2/11/97	0700 PM								97-1619		
	574	A-3	START / STOP	2/11/97	0700 PM								97-1620		
	575	A-2	START / STOP	2/11/97	0700 PM								97-1621		
	576	A-1	START / STOP	2/11/97	0700 PM								97-1622		
	577	MIXED L & R.R.	START / STOP	2/11/97	1100 AM	G	HY	L	1	1			97-1623		

TYPE	MATRIX	CONTAINER	PRESERVATIVE
G - GRAB	L - LIQUID SW - SWIPE	P - PLASTIC B - BAG A - AMBER(glass)	1 - COOL TO 4 C 5 - HCL, pH<2
CF - COMPOSITE, FLOW	S - SOLID	GL - GLASS C - CARTRIDGE	2 - HNO3, pH<2 6 - 0.008% Na2S2O3, 4 C
CT - COMPOSITE, TIME	GS - GAS	T - TEFLON TL - TEFLON LINED LID	3 - H2SO4, pH<2 7 - FIELD FILTER
	SS - SEMI SOLID	V - VOA H - HEXANE RINSED	4 - NaOH, pH>12 8 - NONE

TURNAROUND (Days): _____ (FOR RUSH TURNAROUND STATE REASON BELOW)

COMMENTS:

REGULATION APPLIED:
RCRA ( ) HRSD ( )
SDWA ( ) TSCA ( )
CWA ( ) PHOTO ( )
CAA ( ) OTHER ( )

SAMPLING/COLLECTION CHARGE: $
POSSIBLE SAMPLE HAZARDS:
COMMENTS:

SAMPLE DISPOSAL: ( )RETURN TO CLIENT ( )DISPOSAL BY LAB

Arrival Temp. 2.6°C DSB

D.O. NUMBER: 227/067 INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).**
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. – THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM – 3:30 PM).*

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: [signature]	REC'D BY: R Daniel	COMPANY/COMMAND: BES	DATE/TIME: 2/12/97 1330
RELINQUISHED BY: R Daniel	REC'D BY: [signature]	COMPANY/COMMAND: RES	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

CHAIN-OF-CUSTODY RECORD
& ANALYSIS REQUEST FORM

CONTINUATION SHEET

SHEET 2 OF 2

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

P.O.C.: Douglas Kirk
COMMAND: Oceana NAS

LAB USE ONLY LINE ITEM #	LAB USE ONLY SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	FIELD READINGS TEMPERATURE	FIELD READINGS OTHER	PRESERVATION VERIFIED BY
0002B1	578	Feeds	START	2/11/97	11:20 Am	G	HY	L	1	1	TOXICITY		97-1624		4°C
0002B5			STOP								Mn/Cd				
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												

COMMENTS: Arrival Temp. 2.0°C DSB

D.O. NUMBER: INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).*
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. SAMPLES RECEIVED AFTER 2:00 PM MON. -- THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION
HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: BES Inc	DATE/TIME: 2/12/97 1330
RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: PWC	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

#574

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY
Address DEPT. OF CIVIL & ENVIRONMENTAL ENG.
KDH 135 NORFOLK VA 23529-0241

County _____ Pipe/Outfall/Location _____
NPDES# _____ Instream Waste Conc _____
Sample collected by (print&sign) _____ Affiliation _____
Type of sample ✓ (Grab): Date 2/11/97 Time ~~11:00 AM~~ 7:00 PM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number A-3, 8H Frequency of collection _____ Volume _____
*Temperature of sample in sample collection device 22.0°C
Final temperature of effluent at sample collection point 22.0°C
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? NA dechlorinated? _____ If so, how? _____
Permit with interim chlorine limit? _____ If yes – limit (mg/L) _____
Field pH 7.35 Field Total Residual Chlorine NA
Comments/Sample description _____

Type of test(s) to be performed MYSID & CYPRINODON ACUTE LC50
(Specify organisms) SHRIMP VARIEGATUS
Method of shipment Bayside

Print & Sign Names

1. Relinquished by H. YANG Date 2/12/97 Time 9:00 AM
Received by [signature] Date 2-12-97 Time 10:00
2. Relinquished by [signature] Date 2-12-97 Time 10:15
Received by [signature] Date 2-12-97 Time 10:15
reling. by [signature] 2-12-97 1405
rcd by [signature] 2/12/97 1405

FOR REED LAB USE ONLY

JRA# 97-1620 Arrival Temperature 2.0C On ice? yes
Color tan Odor earthy Solids none
pH 7.72 DO (mg/L) 7.8 Conductivity (umhos/cm) 1800 @ 19.7 °C
Salinity (ppt) 1 TRC (mg/L) N/A Method N/A

Rev 5/16/94

:ute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97.1620

REED & ASSOCIATES

PDES#: N/A CLIENT: Ocean EDU OUTFALL: 4 A-3

RGANISM SOURCE: ABS JRA BATCH#: C202 HATCH DATE: 2/6/97

Conc % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.66	8.42	8.30			7.5	7.7	8.4					20.3	19.5	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.64	8.41	8.24			7.6	7.7	8.4					20.4	19.5	20.6			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.59	8.40	8.29			7.7	7.7	8.2					20.3	19.5	20.6			20	20
100	B	10	10	10																					
25	A	10	10	10			8.42	8.37	8.29			7.9	7.6	8.0					20.3	19.5	20.6			20	20
100	B	10	10	10																					
50	A	10	10	10			8.30	8.29	8.27			8.0	7.6	8.0					20.0	19.5	20.6			20	20
100	B	10	10	10																					
100	A	10	10	10			8.10	8.12	8.18			8.2	7.5	8.0					19.7	19.5	20.6			21	21
100	B	10	10	10																					
INIT		DSB	LDG	DSB																					
DATE 1997		2/12	2/13	2/14																					
TIME		1625	1617	1622																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97.1620

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU

ORGANISM SOURCE: ABS JRA BATCH#: M442 OUTFALL: 4 A-3

HATCH DATE: 2/8/97

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.66	8.31	8.03			7.5	6.4	6.5					20.3	20.0	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.64	8.27	7.86			7.6	6.6	5.0					20.4	20.0	20.6			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.59	8.28	7.98			7.7	6.2	4.0					20.3	20.0	20.6			20	20
100	B	10	10	10																					
25	A	10	10	10			8.42	8.27	8.01			7.9	6.0	3.7					20.3	20.0	20.6			20	20
100	B	10	10	10																					
50	A	10	10	10			8.30	8.22	8.08			8.0	5.9	4.3					20.0	20.0	20.6			20	20
100	B	10	10	10																					
100	A	10	10	10			8.10	8.09	8.03			8.2	6.3	4.6					19.7	20.0	20.6			21	21
95	B	10	9	9																					
INIT		DSB	LDG	DSB																					
DATE 1997		2/12	2/13	2/14																					
TIME		1625	1536	1540																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

GENERAL COMMENTS

JRA# 97-1620

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: 4 A-3

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
2/12/97	0	2/11/97 1900	2/12/97	19.7	8.10	/	8.2	/	1	21	/	/

DO Adj.	pH Adj.	TRC Adj.	Feedings (Mysid)							
Date	Date	Date	1997 Date	2/12	2/13	2/13	2/14			
Method	Method	Method	Time	1718	0850	1645	0859			
Minutes	Amount	Amount	Init	LDG	LDG	LDG	LDG			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
2/12/97	0	2/12/97	20.3	8.66	7.5	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute To 1000
6.25	↓	↓	62.5	↓
12.5	↓	↓	125	↓
25	↓	↓	250	↓
50	↓	↓	500	↓
100	↓	↓	1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB ~~2~~ 2G @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1046203~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

February 20, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0227-068
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 573
Sample ID: B-1
JRA ID: 97-1619

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Claulane
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-1 JRA #: 97-1619

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:20
Test End:	2/14/97	15:35

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.97 - 8.03	8.03 - 8.66
	Adjusted	N/A	

JRA #: 97-1619 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	6.1 - 8.2	6.4 - 7.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1619 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		2/11/97		
Result (mg/L)		0.15		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-1 JRA #: 97-1619

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:20
Test End:	2/14/97	16:20

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 6 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.02 - 8.08	8.30 - 8.66
	Adjusted	N/A	

JRA #: 97-1619 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.6 - 8.2	7.5 - 8.4

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1619 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		2/18/97		
Result (mg/L)		27		
QC Range (mg/L)		0	thru	34

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

B-1

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CLIENT INFORMATION

COMPANY/COMMAND: DLEANA, N ASCODE:
CONTACT: Douglas King
PHONE: 433-3439 EXT: FAX:
J.O. #: 7912290
SIGNATURE:
PERMIT NO.:

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002814 0002855	571	B-3	START	2/11/97	0700	G	HY	L	1	1	TOXICITIES MD/CV		97-1617		4°C
			STOP		PM										
	572	B-2	START	2/11/97	0700								97-1618		
			STOP		PM										
	573	B-1	START	2/11/97	0700								97-1619		
			STOP		PM										
	574	A-3	START	2/11/97	0700								97-1620		
			STOP		PM										
	575	A-2	START	2/11/97	0700								97-1621		
			STOP		PM										
	576	A-1	START	2/11/97	0700								97-1622		
			STOP		PM										
	577	MIXED L & R.R.	START	2/11/97	1100	G	HY	L	1	1			97-1623		
			STOP		AM										

TYPE	MATRIX	CONTAINER	PRESERVATIVE
G - GRAB	L - LIQUID	P - PLASTIC	1 - COOL TO 4 C
CF - COMPOSITE, FLOW	S - SOLID	GL - GLASS	2 - HNO3, pH<2
CT - COMPOSITE, TIME	GS - GAS	T - TEFLON	3 - H2SO4, pH<2
	SS - SEMI SOLID	V - VOA	4 - NaOH, pH>12
	SW - SWIPE	B - BAG	5 - HCL, pH<2
		C - CARTRIDGE	6 - 0.008% Na2S2O3, 4 C
		TL - TEFLON LINED LID	7 - FIELD FILTER
		H - HEXANE RINSED	8 - NONE
		A - AMBER(glass)	

TURNAROUND (Days): _____ (FOR RUSH TURNAROUND STATE REASON BELOW)

COMMENTS:

SAMPLE DISPOSAL: ( )RETURN TO CLIENT ( )DISPOSAL BY LAB

REGULATION APPLIED:

RCRA ( ) HRSD ( )
SDWA ( ) TSCA ( )
CWA ( ) PHOTO ( )
CAA ( ) OTHER ( )

SAMPLING/COLLECTION CHARGE: $
POSSIBLE SAMPLE HAZARDS:
COMMENTS:

Arrival Temp. 2.6°C

D.O. NUMBER: 227 / 067 INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).*
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. SAMPLES RECEIVED AFTER 2:00 PM MON. -- THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION:

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: Darrell Goodwin	REC'D BY: R Daniel	COMPANY/COMMAND: PWC	DATE/TIME: 2/11/97 1330
RELINQUISHED BY: R Daniel	REC'D BY:	COMPANY/COMMAND: PWC	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CONTINUATION SHEET

SHEET 2 OF 2

P.O.C.: Douglas Kirk
COMMAND: Oceana NAS

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002B(T	578	Feeds	START	2/11/97	11:00	G	HY	L	1	1	TOXICITY		97.1624		4°C
0002BS			STOP		AM						m.b/Cd				
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												

COMMENTS: Arrival Temp. 20°C

D.O. NUMBER: INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).**
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. -- THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).*

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: BES Inc	DATE/TIME: 2/12/97 1330
RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: PWC	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

#573

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY
Address DEPT. OF CIVIL & ENVIRONMENTAL ENG.
KDH 135 NORFOLK VA 23529-0241

County _____ Pipe/Outfall/Location _____
NPDES# _____ Instream Waste Conc _____
Sample collected by (print&sign) _____ Affiliation _____
Type of sample ✓ (Grab): Date 2/11/97 Time 7:00 PM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number B-1, 8Hr. Frequency of collection _____ Volume _____
*Temperature of sample in sample collection device 22.0°C
Final temperature of effluent at sample collection point _____
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
***It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)**
Is the sample chlorinated? NA dechlorinated? _____ If so, how? _____
Permit with interim chlorine limit? _____ If yes – limit (mg/L) _____
Field pH 7.11 Field Total Residual Chlorine NA
Comments/Sample description _____

Type of test(s) to be performed MYSID SHRIMP & CYPRINODON VARIEGATUS ACUTE LC50
(Specify organisms)
Method of shipment Bayside

Print & Sign Names

1. Relinquished by H. YANG Date 2/12/97 Time 8:00 AM
   Received by [signature] Date 2-12-97 Time 10:00 A.M.
2. Relinquished by [signature] Date 2-12-97 Time 10:15 A.M.
   Received by [signature] Date 2-12-97 Time 10:15 AM
   Relinq. by [signature] 2-12-97 1405
   Rcd. by [signature] 2/12/97 1405

FOR REED LAB USE ONLY

JRA# 97-1619 Arrival Temperature 2.0°C On ice? yes
Color tan Odor earthy Solids none
pH 7.36 DO (mg/L) 7.8 Conductivity (µmhos/cm) 1800 @ 19.7 °C
Salinity (ppt) 1 TRC (mg/L) N/A Method N/A

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-1619

REED & ASSOCIATES

NPDES#: NA CLIENT: Oceana ODU OUTFALL: 3 B-1

ORGANISM SOURCE: ABS JRA BATCH#: C202 HATCH DATE: 2/6/97

Conc % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 80%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.66	8.42	8.30			7.5	7.7	8.4					20.3	19.5	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.62	8.36	8.25			7.7	7.7	8.0					20.4	19.5	20.6			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.58	8.36	8.24			7.8	7.7	7.7					20.4	19.5	20.6			20	20
100	B	10	10	10																					
25	A	10	10	10			8.45	8.32	8.21			7.9	7.7	7.4					20.3	19.5	20.6			20	20
100	B	10	10	10																					
50	A	10	9	9			8.32	8.24	8.13			8.0	7.6	6.7					20.2	19.5	20.6			20	20
95	B	10	10	10																					
100	A	10	10	10			8.02	8.08	8.07			8.2	7.6	7.9					19.7	19.5	20.6			20	20
100	B	10	10	10																					
INIT		DB	LDG	DB																					
DATE 1997		2/12	2/13	2/14																					
TIME		1620	1614	1620																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

ite *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-1619

REED & ASSOCIATES

PDES#: N/A CLIENT: Ocean OUTFALL: 3 B-1

RGANISM SOURCE: ABS JRA BATCH#: M442 HATCH DATE: 2/8/97

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
C	A	10	10	10			8.66	8.31	8.03			7.5	6.4	6.5					20.3	20.0	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.62	8.30	7.99			7.7	6.9	5.4					20.4	20.0	20.6			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.58	8.31	7.95			7.8	7.0	5.4					20.4	20.0	20.6			20	20
100	B	10	10	10																					
25	A	10	10	10			8.45	8.25	7.84			7.9	6.4	3.9					20.3	20.0	20.6			20	20
100	B	10	10	10																					
50	A	10	10	10			8.32	8.16	7.89			8.0	6.4	4.0					20.2	20.0	20.6			20	20
100	B	10	10	10																					
100	A	10	10	10			8.02	8.03	7.97			8.2	6.8	6.1					19.7	20.0	20.6			20	20
100	B	10	10	10																					
INIT		DB	LOG	DB																					
DATE 1997		2/12	2/13	2/14																					
TIME		1620	1535	1535																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" *C. variegatus* " "

GENERAL COMMENTS

JRA# 97-1619

REED & ASSOCIATES

NPDES#: NA CLIENT: Oceana OUTFALL: 3 B-1

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
2/12/97	0	2/11/97 1900	2/12/97	19.7	8.02	/	8.2	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

			1997 Date	2/12	2/13	2/13	2/14	
Date	Date	Date	Time	1718	0850	1645	0855	
Method	Method	Method	Init	LDG	LDG	LDG	LDG	
Minutes	Amount	Amount						

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
2/12/97	0	2/12/97	20.3	8.66	7.5	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute to 1000
6.25			62.5	
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DB
NUMBER OF ORGANISMS	DB
STATISTICAL ANALYSES	NA

ANALYST SIGNATURES	INITIALS
[signature]	DB

TEST CHAMBER SIZE: 250mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	2 RG
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	~~Baxter~~ VWR	digi-thermo	~~1046303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

February 20, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0227-068
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 572
Sample ID: B-2
JRA ID: 97-1618

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Clarlone
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-2 JRA #: 97-1618

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:15
Test End:	2/14/97	15:25

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.87 - 7.96	8.03 - 8.66
	Adjusted	N/A	

JRA #: 97-1618 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	6.2 - 8.3	6.4 - 7.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1618 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50			>100%		
Survival		(NOEC)		(LOEC)	
	Normal Distribution (yes/no)				
	Homogeneous Variance (yes/no)				
Growth or Reproduction		(NOEC)		(LOEC)	
	Normal Distribution (yes/no)				
	Homogeneous Variance (yes/no)				
Reference Toxicant Test Date			2/11/97		
	Result (mg/L)		0.15		
	QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-2 JRA #: 97-1618

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:15
Test End:	2/14/97	16:10

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 6 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.87 - 8.02	8.30 - 8.66
	Adjusted	N/A	

JRA #: 97-1618 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.5 - 8.3	7.5 - 8.4

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1618 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		2/18/97		
Result (mg/L)		27		
QC Range (mg/L)		0	thru	34

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

B-2

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CLIENT INFORMATION

COMPANY/COMMAND: OCEANA, NAS CODE:
CONTACT: Douglas Kirk
PHONE: 433-3439 EXT: FAX:
J.O. #: 191229C
SIGNATURE:
PERMIT NO.:

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002BH 0002BS	571	B-3	START / STOP	2/11/97	0700 PM	G	HY	L	1	1	TOXICITIES Mn/Cu		97-1617		4°C
	572	B-2	START / STOP	2/11/97	0700 PM								97-1618		
	573	B-1	START / STOP	2/11/97	0700 PM								97-1619		
	574	A-3	START / STOP	2/11/97	0700 PM								97-1620		
	575	A-2	START / STOP	2/11/97	0700 PM								97-1621		
	576	A-1	START / STOP	2/11/97	0700 PM								97-1622		
	577	MIXED by RR	START / STOP	2/11/97	1100 AM	G	HY	L	1	1			97-1623		

TYPE	MATRIX	CONTAINER	PRESERVATIVE
G - GRAB	L - LIQUID SW - SWIPE	P - PLASTIC B - BAG A - AMBER(glass)	1 - COOL TO 4 C 5 - HCL, pH<2
CF - COMPOSITE, FLOW	S - SOLID	GL - GLASS C - CARTRIDGE	2 - HNO3, pH<2 6 - 0.008% Na2S2O3, 4 C
CT - COMPOSITE, TIME	GS - GAS	T - TEFLON TL - TEFLON LINED LID	3 - H2SO4, pH<2 7 - FIELD FILTER
	SS - SEMI SOLID	V - VOA H - HEXANE RINSED	4 - NaOH, pH>12 8 - NONE

TURNAROUND (Days): _____ *(FOR RUSH TURNAROUND STATE REASON BELOW)*

COMMENTS:

REGULATION APPLIED:
RCRA ( ) HRSD ( )
SDWA ( ) TSCA ( )
CWA ( ) PHOTO ( )
CAA ( ) OTHER ( )

SAMPLING/COLLECTION CHARGE: $
POSSIBLE SAMPLE HAZARDS:
COMMENTS:

SAMPLE DISPOSAL: ( )RETURN TO CLIENT ( )DISPOSAL BY LAB

Arrival Temp. 2.6°C DSB

D.O. NUMBER: 227/067 INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).**
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. -- THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).*

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION:
HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: BES	DATE/TIME: 2/12/97 1330
RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: RES	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CONTINUATION SHEET

SHEET 2 OF 2

P.O.C.: Douglas Kirk
COMMAND: Oceana NAS

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002B(1	578	Feeds	START	2/11/97	11:00 AM	G	HY	L	1	1	TOXICITY		97.1624		4°C GB
0002B5			STOP								m+/CL				
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												

COMMENTS: Arrival Temp. 2.0°C DSG

D.O. NUMBER:
CONTRACT LAB:
CONTRACT NO.(S):
INIT.:
DATE:
OFFICIAL USE ONLY

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).**
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. -- THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).*

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: Gayll Goodnel	REC'D BY: R Hamell	COMPANY/COMMAND: BES Inc	DATE/TIME: 2/12/97 1330
RELINQUISHED BY: R Hamell	REC'D BY: [illegible]	COMPANY/COMMAND: PWC	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

#572

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY
Address DEPT. OF CIVIL & ENVIRONMENTAL ENG.
KDH 135 NORFOLK VA 23529-0241

County _____ Pipe/Outfall/Location _____
NPDES# _____ Instream Waste Conc _____
Sample collected by (print&sign) _____ Affiliation _____
Type of sample ✓ (Grab): Date 2/11/97 Time 7:00 PM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number B-2. 8 Hr. Frequency of collection _____ Volume _____
*Temperature of sample in sample collection device 22.0°C
Final temperature of effluent at sample collection point _____
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? NA dechlorinated? _____ If so, how? _____
Permit with interim chlorine limit? _____ If yes – limit (mg/L) _____
Field pH 7.02 Field Total Residual Chlorine NA
Comments/Sample description _____

Type of test(s) to be performed MYSID & CYPRINODON ACUTE LC50
(Specify organisms) SHRIMP VARIEGATUS
Method of shipment Bayside

Print & Sign Names

1. Relinquished by H. YANG Date 2/12 197 Time 9:00 AM
Received by Keith Cofiel Date 2-12-97 Time 10:00 A.M.
2. Relinquished by Keith Cofiel Date 2-12-97 Time 10:15 A.M.
Received by [signature] Date 2-12-97 Time 10:15 AM
Relinq. by [signature] 2-12-97 1405
Rcd by [signature] 2/12/97 1405

FOR REED LAB USE ONLY

JRA# 97-1618 Arrival Temperature 2.0C On ice? yes
Color tan Odor earthy Solids none
pH 7.26 DO (mg/L) 7.8 Conductivity (µmhos/cm) 1800 @ 19.5 °C
Salinity (ppt) 1 TRC (mg/L) N/A Method N/A

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-1618

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana OIU OUTFALL: 2 B-2

ORGANISM SOURCE: ABS JRA BATCH#: C202 HATCH DATE: 2/6/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.66	8.42	8.30			7.5	7.7	8.4					20.3	19.5	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.62	8.34	8.24			7.7	7.7	8.0					20.4	19.5	20.6			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.51	8.35	8.22			7.8	7.7	7.6					20.4	19.5	20.6			20	20
100	B	10	10	10																					
25	A	10	10	10			8.38	8.29	8.19			8.0	7.6	7.3					20.3	19.5	20.6			20	20
100	B	10	10	10																					
50	A	10	10	10			8.20	8.20	8.12			8.1	7.6	6.1					20.0	19.5	20.6			20	20
100	B	10	10	10																					
100	A	10	10	10			7.87	7.99	8.02			8.3	7.5	7.6					19.5	19.5	20.6			20	20
100	B	10	10	10																					

INIT		DSB	LDG	DSB		
DATE 1997		2/12	2/13	2/14		
TIME		1615	1610	1610		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

...ite *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-1618

REED & ASSOCIATES

...DES#: N/A CLIENT: Oceana ODU OUTFALL: 2 B-2

...RGANISM SOURCE: ABS JRA BATCH#: M442 HATCH DATE: 2/8/97

...onc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.66	8.31	8.03			7.5	6.4	6.5					20.3	20.0	20.6			20	
100	B	10	10	10																					
6.25	A	10	10	10			8.62	8.27	8.00			7.7	6.6	6.2					20.4	20.0	20.6			20	20
100	B	10	10	10																					
12.5	A	10	9	9			8.51	8.26	7.94			7.8	6.5	5.8					20.4	20.0	20.6			20	20
95	B	10	10	10																					
25	A	10	10	10			8.38	8.21	7.91			8.0	6.7	5.4					20.3	20.0	20.6			20	20
100	B	10	10	10																					
50	A	10	10	10			8.20	8.13	7.94			8.1	6.8	5.4					20.0	20.0	20.6			20	20
100	B	10	10	10																					
100	A	10	9	9			7.87	7.96	7.96			8.3	6.8	6.2					19.5	20.0	20.6			20	20
90	B	10	9	9																					

INIT	DSB	LDG	DSB		
DATE 1997	2/12	2/13	2/14		
TIME	1615	~~1630~~ 1530 ELDC	1525		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

GENERAL COMMENTS

JRA# 97-1618

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: 2 B-2

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
2/12/97	0	2/11/97 1900	2/12/97	19.5	7.87	/	8.3	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	1997 Date	2/12	2/13	2/13	2/14			
Method	Method	Method	Time	1718	0850	1645	0859			
Minutes	Amount	Amount	Init	LDG	LDG	LDG	LDG			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
2/12/97	0	2/12/97	20.3	8.66	7.5	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute To 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB ~~C~~ ~~R~~ G @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1046303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

February 20, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0227-068
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 571
Sample ID: B-3
JRA ID: 97-1617

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Claiborne
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-3 JRA #: 97-1617

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:10
Test End:	2/14/97	15:20

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.87 - 7.97	8.03 - 8.66
	Adjusted	N/A	

JRA #: 97-1617 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	5.1 - 8.2	6.4 - 7.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1617 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50			>100%		
Survival		(NOEC)		(LOEC)	
	Normal Distribution (yes/no)				
	Homogeneous Variance (yes/no)				
Growth or Reproduction		(NOEC)		(LOEC)	
	Normal Distribution (yes/no)				
	Homogeneous Variance (yes/no)				
Reference Toxicant Test Date			2/11/97		
	Result (mg/L)		0.15		
	QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-3 JRA #: 97-1617

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:10
Test End:	2/14/97	16:06

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 6 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.97 - 8.08	8.30 - 8.66
	Adjusted	N/A	

JRA #: 97-1617 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.5 - 8.2	7.5 - 8.4

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1617 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		2/18/97		
Result (mg/L)		27		
QC Range (mg/L)		0	thru	34

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

B-3

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

ENVIRONMENTAL

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

CLIENT INFORMATION

COMPANY/COMMAND: DLEANA, N ASCODE:
CONTACT: Douglas Kirk
PHONE: 433 3439 EXT: FAX:
J.O. #: 79122'10
SIGNATURE:
PERMIT NO.:

LAB USE ONLY LINE ITEM #	LAB USE ONLY SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	FIELD READINGS TEMPERATURE	FIELD READINGS OTHER	PRESERVATION VERIFIED BY
0002B/H 0002B5	571	B-3	START	2/11/97	07:00	G	HY	L	1	1	TOXICITY MB/CV		97-1617		4°C
			STOP		PM										
	572	B-2	START	2/11/97	07:00								97-1618		
			STOP		PM										
	573	B-1	START	2/11/97	07:00								97-1619		
			STOP		PM										
	574	A-3	START	2/11/97	07:00								97-1620		
			STOP		PM										
	575	A-2	START	2/11/97	07:00								97-1621		
			STOP		PM										
	576	A-1	START	2/11/97	07:00								97-1622		
			STOP		PM										
	577	MIXED L & R.E.	START	2/11/97	11:00	G	HY	L	1	1			97-1623		
			STOP		AM										

TYPE	MATRIX	CONTAINER	PRESERVATIVE
G - GRAB	L - LIQUID SW - SWIPE	P - PLASTIC B - BAG A - AMBER(glass)	1 - COOL TO 4 C 5 - HCL, pH<2
CF - COMPOSITE, FLOW	S - SOLID	GL - GLASS C - CARTRIDGE	2 - HNO3, pH<2 6 - 0.008% Na2S2O3, 4 C
CT - COMPOSITE, TIME	GS - GAS	T - TEFLON TL - TEFLON LINED LID	3 - H2SO4, pH<2 7 - FIELD FILTER
	SS - SEMI SOLID	V - VOA H - HEXANE RINSED	4 - NaOH, pH>12 8 - NONE

TURNAROUND (Days): _____ (FOR RUSH TURNAROUND STATE REASON BELOW)

COMMENTS:

SAMPLE DISPOSAL: ( )RETURN TO CLIENT ( )DISPOSAL BY LAB

REGULATION APPLIED:

RCRA ( ) HRSD ( )
SDWA ( ) TSCA ( )
CWA ( ) PHOTO ( )
CAA ( ) OTHER ( )

SAMPLING/COLLECTION CHARGE: $
POSSIBLE SAMPLE HAZARDS:
COMMENTS:

Arrival Temp. 2.6°C

D.O. NUMBER: 227 / 061 INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).*
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. SAMPLES RECEIVED AFTER 2:00 PM MON. -- THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
Lowell Goodwin	R Daniel	PWC	2/12/97 1330
R Daniel		PWC	2/12/97 1405

CHAIN-OF-CUSTODY RECORD
& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CONTINUATION SHEET
SHEET 2 OF 2

P.O.C.: Douglas Kirk
COMMAND: Oceana NAS

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002BH 0002BJ	578	Feeds	START / STOP	2/11/97	11:00 AM	G	HY	L	1	1	TOXICITY m/l/CV		97-1624		4°C
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												
			START / STOP												

COMMENTS:

Arrival Temp. 2.0°C

D.O. NUMBER:
CONTRACT LAB:
CONTRACT NO.(S):
INIT.:
DATE:
OFFICIAL USE ONLY

1. CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).*
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. SAMPLES RECEIVED AFTER 2:00 PM MON. – THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM – 3:30 PM).

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: BES Inc	DATE/TIME: 2/12/97 1331
RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: [illegible]	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

#571

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY
Address DEPT. OF CIVIL & ENVIRONMENTAL ENG.
KDH 135 NORFOLK VA 23529-0241

County _____ Pipe/Outfall/Location _____
NPDES# _____ Instream Waste Conc _____
Sample collected by (print&sign) _____ Affiliation _____
Type of sample ✓ (Grab): Date 2/11/97 Time 7:00 PM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number B-3, 8 Hr. Frequency of collection _____ Volume _____
*Temperature of sample in sample collection device 22.0°C
Final temperature of effluent at sample collection point _____
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? NA dechlorinated? _____ If so, how? _____
Permit with interim chlorine limit? _____ If yes – limit (mg/L) _____
Field pH 7.09 Field Total Residual Chlorine NA
Comments/Sample description _____

Type of test(s) to be performed MYSID SHRIMP & CYPRINODON VARIEGATUS ACUTE LC50
(Specify organisms)
Method of shipment Bayside

Print & Sign Names

1. Relinquished by H. YANG Date 2/12/97 Time 9:00 AM
   Received by Keith Cutt Date 2/12/97 Time 10:00 A.M.
2. Relinquished by Keith Cutt Date 2-12-97 Time 10:15 A.M.
   Received by [illegible] Date 2-12-97 Time 10:15 AM
   Rel'd by [illegible] 2-12-97 1405
   Rc'd by [illegible] 2/12/97 1405

FOR REED LAB USE ONLY

JRA# 97-1617 Arrival Temperature 2.0°C On ice? yes
Color tan Odor earthy Solids none
pH 7.32 DO (mg/L) 8.0 Conductivity (µmhos/cm) 1800 @ 19.3 °C
Salinity (ppt) 1 TRC (mg/L) NA Method NA

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-1617

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana COU OUTFALL: 1 B-3

ORGANISM SOURCE: ABS JRA BATCH#: C202 HATCH DATE: 2/6/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.66	8.42	8.30			7.5	7.7	8.4					20.3	19.5	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.65	8.40	8.27			7.7	7.7	7.9					20.3	19.5	20.6			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.60	8.36	8.23			7.8	7.7	7.7					20.3	19.5	20.6			20	20
100	B	10	10	10																					
25	A	10	10	10			8.52	8.31	8.19			7.9	7.6	7.3					20.0	19.5	20.6			20	20
95	B	10	9	9																					
50	A	10	10	10			8.38	8.21	8.12			8.0	7.4	6.6					19.8	19.5	20.6			20	20
100	B	10	10	10																					
100	A	10	10	10			7.97	8.03	8.08			8.2	7.5	8.2					19.3	19.5	20.6			20	20
100	B	10	10	10																					

INIT	DSB	LDG	DSB		
DATE 1997	2/12	2/13	2/14		
TIME	1610	1607	1606		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 96-1617

REED & ASSOCIATES

NPDES#: N/A CLIENT: Ocean OUTFALL: 1 B-3

ORGANISM SOURCE: ABS JRA BATCH#: M442 HATCH DATE: 2/8/97

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
C	A	10	10	10			8.66	8.31	8.03			7.5	6.4	6.5					20.3	20.0	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.65	8.28	7.95			7.7	6.0	5.0					20.3	20.0	20.6			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.60	8.26	7.90			7.8	6.0	3.8					20.3	20.0	20.6			20	20
100	B	10	10	10																					
25	A	10	10	10			8.52	8.23	7.91			7.9	5.9	4.1					20.0	20.0	20.6			20	20
100	B	10	10	10																					
50	A	10	10	10			8.38	8.15	7.95			8.0	6.0	4.2					19.8	20.0	20.6			20	20
100	B	10	10	10																					
100	A	10	10	10			7.97	7.93	7.87			8.2	6.2	5.1					19.3	20.0	20.6			20	20
100	B	10	10	10																					
INIT		DSJ	LDG	DSJ																					
DATE 1997		2/12	2/13	2/14																					
TIME		1610	~~1620~~ 0100 1520	1520																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " " GENERAL COMMENTS

JRA# 97-1617

REED & ASSOCIATES

NPDES#: NA CLIENT: Oceana EDLL OUTFALL: 1 B-3

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
2/12/97	0	2/11/97 1900	2/12/97	19.3	7.97	/	8.2	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mys.)

			1997						
Date	Date	Date	Date	2/12	2/13	2/13	2/14		
Method	Method	Method	Time	1718	0850	1645	0859		
Minutes	Amount	Amount	Init	LDG	LDG	LDG	LDG		

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
2/12/97	0	2/12/97	20.3	8.66	7.5	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute to 1000
6.25			62.5	
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DB
NUMBER OF ORGANISMS	DB
STATISTICAL ANALYSES	NA

ANALYST SIGNATURES	INITIALS
	DB

TEST CHAMBER SIZE: 250mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	2 RG
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	~~Baxter~~ VWR	digi-thermo	~~1946303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

February 20, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0227-068
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 577
Sample ID: Mixed L. of R.R.
JRA ID: 97-1623

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Clarlone
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Mixed L. of R.R. JRA #: 97-1623

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:40
Test End:	2/14/97	16:00

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.94 - 8.09	8.03 - 8.66
	Adjusted	N/A	

JRA #: 97-1623 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	5.5 - 8.4	6.4 - 7.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1623 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		2/11/97		
Result (mg/L)		0.15		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Mixed L. of R.R. JRA #: 97-1623

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:40
Test End:	2/14/97	17:00

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 6 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.04 - 8.09	8.30 - 8.66
	Adjusted	N/A	

JRA #: 97-1623 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.1 - 8.4	7.5 - 8.4

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1623 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		2/18/97		
Result (mg/L)		27		
QC Range (mg/L)		0	thru	34

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

Mixed L. of R.R.

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CLIENT INFORMATION

COMPANY/COMMAND: OCEANA, NAS CODE:
CONTACT: Douglas Kirk
PHONE: 433-3439 EXT: FAX:
J.O. #: 1912240
SIGNATURE:
PERMIT NO.:

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002BH 0002BS	571	B-3	START / STOP	2/11/97	0700 PM	G	HY	L	1	1	TOXICITIES MH/CV		97-1617		4°C
	572	B-2	START / STOP	2/11/97	0700 PM								97-1618		
	573	B-1	START / STOP	2/11/97	0700 PM								97-1619		
	574	A-3	START / STOP	2/11/97	0700 PM								97-1620		
	575	A-2	START / STOP	2/11/97	0700 PM								97-1621		
	576	A-1	START / STOP	2/11/97	0700 PM								97-1622		
	577	MIXED LQ RR.	START / STOP	2/11/97	1100 AM	G	HY	L	1	1			97-1623		

TYPE	MATRIX		CONTAINER			PRESERVATIVE	
G - GRAB	L - LIQUID	SW - SWIPE	P - PLASTIC	B - BAG	A - AMBER(glass)	1 - COOL TO 4 C	5 - HCL, pH<2
CF - COMPOSITE, FLOW	S - SOLID		GL - GLASS	C - CARTRIDGE		2 - HNO3, pH<2	6 - 0.008% Na2S2O3, 4 C
CT - COMPOSITE, TIME	GS - GAS		T - TEFLON	TL - TEFLON LINED LID		3 - H2SO4, pH<2	7 - FIELD FILTER
	SS - SEMI SOLID		V - VOA	H - HEXANE RINSED		4 - NaOH, pH>12	8 - NONE

TURNAROUND (Days): _____ (FOR RUSH TURNAROUND STATE REASON BELOW)

COMMENTS:

REGULATION APPLIED:
RCRA ( ) HRSD ( )
SDWA ( ) TSCA ( )
CWA ( ) PHOTO ( )
CAA ( ) OTHER ( )

SAMPLING/COLLECTION CHARGE: $
POSSIBLE SAMPLE HAZARDS:
COMMENTS:

SAMPLE DISPOSAL: ( )RETURN TO CLIENT ( )DISPOSAL BY LAB

Arrival Temp. 2.6°C DSB

D.O. NUMBER: 227/061 INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).*
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. SAMPLES RECEIVED AFTER 2:00 PM MON. – THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM – 3:30 PM).

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: [signature]	DATE/TIME: 2/11/97 1330
RELINQUISHED BY: [signature]	REC'D BY: [signature]	COMPANY/COMMAND: [signature]	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CONTINUATION SHEET

SHEET 2 OF 2

P.O.C.: Douglas Kirk
COMMAND: Oceana NAS

LAB USE ONLY LINE ITEM #	LAB USE ONLY SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	FIELD READINGS TEMPERATURE	FIELD READINGS OTHER	PRESERVATION VERIFIED BY
0002B(1	578	Feeds	START	2/11/97	11:00 AM	G	HY	L	1	1	TOXICITY		97.1624		4°C
0002B5			STOP								MB/CB				
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												

COMMENTS: Arrival Temp. 2.0°C

D.O. NUMBER:
CONTRACT LAB:
CONTRACT NO.(S):
OFFICIAL USE ONLY
INIT.:
DATE:

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).**
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. – THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).*

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: Gayle Goodrich	REC'D BY: R Farrell	COMPANY/COMMAND: BES Inc	DATE/TIME: 2/12/97 1330
RELINQUISHED BY: R Farrell	REC'D BY: [illegible]	COMPANY/COMMAND: PWC	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

#577

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY
Address DEPT. OF CIVIL & ENVIRONMENTAL ENG.
KDH 135 NORFOLK VA 23529-0241
County _____ Pipe/Outfall/Location _____
NPDES# _____ Instream Waste Conc _____
Sample collected by (print&sign) _____ Affiliation _____
Type of sample ✓ (Grab): Date 2/11/97 Time 11:00 AM
_____ (Composite): From Date _____ Time _____
To Date _____ Time _____

Subsamples comprising composite:
Number Mix L. of R.R. Frequency of collection _____ Volume 2 L.
*Temperature of sample in sample collection device 22.0°C.
Final temperature of effluent at sample collection point _____
*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____
*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)
Is the sample chlorinated? NA dechlorinated? _____ If so, how? _____
Permit with interim chlorine limit? _____ If yes – limit (mg/L) _____
Field pH 7.35 Field Total Residual Chlorine NA
Comments/Sample description _____

Type of test(s) to be performed MYSID SHRIMP & CYPRINODON VARIEGATUS ACUTE LC50
(Specify organisms)
Method of shipment Bayside

Print & Sign Names

1. Relinquished by H. YANG Date 2/12/97 Time 9:00 AM
Received by [signature] Date 2-12-97 Time 10:00
2. Relinquished by [signature] Date 2-12-97 Time 10:15
Received by [signature] Date 2-12-97 Time 10:15
Relinq. by [signature] 2-12-97 1405
Rcd by [signature] 2/12/97 1405

FOR REED LAB USE ONLY

JRA# 97-1623 Arrival Temperature 2.0°C On ice? yes
Color tan Odor earth Solids none
pH 7.43 DO (mg/L) 9.0 Conductivity (µmhos/cm) 1800 @ 19.7 °C
Salinity (ppt) 1 TRC (mg/L) NA Method NA

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97.1623

NPDES#: N/A CLIENT: Oxenna DDU OUTFALL: 7 Mix L. f R.R

ORGANISM SOURCE: ABS JRA BATCH#: C202 HATCH DATE: 2/6/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.66	8.42	8.30			7.5	7.7	8.4					20.3	19.5	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.60	8.35	8.26			7.7	7.2	7.8					20.4	19.5	20.6			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.58	8.35	8.26			7.8	7.1	7.7					20.4	19.5	20.6			20	20
100	B	10	10	10																					
25	A	10	10	10			8.49	8.31	8.22			8.0	7.0	7.5					20.3	19.5	20.6			20	20
100	B	10	10	10																					
50	A	10	10	10			8.30	8.22	8.14			8.1	6.8	7.0					20.1	19.5	20.6			20	20
100	B	10	10	10																					
100	A	10	10	10			8.09	8.04	8.03			8.4	7.1	7.1					19.7	19.5	20.6			20	20
100	B	10	10	10																					

INIT		DSB	DSB	LDG		
DATE 19 97		2/12	2/13	2/14		
TIME		1640	1630	1700		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

cute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-1623

NPDES#: N/A CLIENT: Ocean EDU OUTFALL: 7 Mix L. of R.R.

ORGANISM SOURCE: ABS JRA BATCH#: M442 HATCH DATE: 2/8/97

Conc (%)	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%) 0	24	48			pH (Day 0: 6.0 - 9.0) 0	24	48			DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C) 0	24	48					TEMPERATURE (19 - 21°C) 0	24	48			SALINITY (19 - 21ppt) 0	END
HOURS⇒																									
0	A	10	10	10			8.66	8.31	8.03			7.5	6.4	6.5					20.3	20.0	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.60	8.34	~~8.03~~ 8.10	ALDG		7.7	6.8	6.5 6.0	ALDG				20.4	20.0	20.6			20	20
95	B	10	9	9																					
12.5	A	10	10	10			8.58	8.26	~~8.10~~ 7.99	ALDG		7.8	6.0	~~6.0~~ 4.9	ALDG				20.4	20.0	20.6			20	20
100	B	10	10	10																					
25	A	10	10	10			8.49	8.20	~~7.99~~ 8.03	ALDG		8.0	5.6	~~4.9~~ 5.1	ALDG				20.3	20.0	20.6			20	20
100	B	10	10	10																					
50	A	10	10	10			8.30	8.17	8.03			8.1	5.8	5.1					20.1	20.0	20.6			20	20
100	B	10	10	10																					
100	A	10	10	10			8.01	8.00	7.94			8.4	6.1	5.5					19.7	20.0	20.6			20	20
100	B	10	10	10																					
INIT		DSB	LDG	DSB																					
DATE 1997		2/12	2/13	2/14																					
TIME		1640	1554	1600																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

GENERAL COMMENTS

JRA# 97-1623

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana CDU OUTFALL: 7 Mix L. & R.

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
2/12/97	0	2/11/97 1100	2/12/97	19.7	8.09	/	8.4	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	1997 Date	2/12	2/13	2/13	2/14			
Method	Method	Method	Time	1718	0850	1645	0859			
Minutes	Amount	Amount	Init	LDG	LDG	LDG	LDG			

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
2/12/97	0	2/12/97	20.3	8.66	7.5	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute To 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB ~~2~~ 2G @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1046303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

February 20, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0227-068
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 578
Sample ID: Feed S.
JRA ID: 97-1624

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Elaine Claiborne
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Feed S. JRA #: 97-1624

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:45
Test End:	2/14/97	16:02

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.63 - 7.92	8.03 - 8.66
	Adjusted	N/A	

JRA #: 97-1624 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	0.7 - 8.3	6.4 - 7.5

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1624 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		<6.25%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		2/11/97		
Result (mg/L)		0.15		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

DO dropped below 4.0 mg/L in the 12.5 - 100% treatments.

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Feed S. JRA #: 97-1624

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	2/12/97	16:45
Test End:	2/14/97	17:05

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 6 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.63 - 8.15	8.30 - 8.66
	Adjusted	N/A	

JRA #: 97-1624 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	<0.1 - 8.3	7.5 - 8.4

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-1624 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		31%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		2/18/97		
	Result (mg/L)	27		
	QC Range (mg/L)	0	thru	34

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	E
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

DO dropped below 4.0 mg/L in all treatments.

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

Feed S.

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	<6.25	31		

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CLIENT INFORMATION

COMPANY/COMMAND: DLEANA N ASCODE:
CONTACT: Douglas King
PHONE: 433-3439 EXT: FAX:
J.O. #: 991229C
SIGNATURE:
PERMIT NO.:

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
000284	571	B-3	START	2/11/97	07:00	G	HY	L	1	1	TOXICITY		97-1617		4°C
000285			STOP		PM						MB/GV				
	572	B-2	START	2/11/97	07:00								97-1618		
			STOP		PM										
	573	B-1	START	2/11/97	07:00								97-1619		
			STOP		PM										
	574	A-3	START	2/11/97	07:00								97-1620		
			STOP		PM										
	575	A-2	START	2/11/97	07:00								97-1621		
			STOP		PM										
	576	A-1	START	2/11/97	07:00								97-1622		
			STOP		PM										
	577	MIXED L & R	START	2/11/97	11:00	G	HY	L	1	1			97-1623		
			STOP		AM										

TYPE	MATRIX	CONTAINER	PRESERVATIVE
G - GRAB	L - LIQUID SW - SWIPE	P - PLASTIC B - BAG A - AMBER(glass)	1 - COOL TO 4 C 5 - HCL, pH<2
CF - COMPOSITE, FLOW	S - SOLID	GL - GLASS C - CARTRIDGE	2 - HNO3, pH<2 6 - 0.008% Na2S2O3, 4 C
CT - COMPOSITE, TIME	GS - GAS	T - TEFLON TL - TEFLON LINED LID	3 - H2SO4, pH<2 7 - FIELD FILTER
	SS - SEMI SOLID	V - VOA H - HEXANE RINSED	4 - NaOH, pH>12 8 - NONE

TURNAROUND (Days): _____ *(FOR RUSH TURNAROUND STATE REASON BELOW)*

COMMENTS:

SAMPLE DISPOSAL: ( )RETURN TO CLIENT ( )DISPOSAL BY LAB

REGULATION APPLIED:

RCRA ( ) HRSD ( )
SDWA ( ) TSCA ( )
CWA ( ) PHOTO ( )
CAA ( ) OTHER ( )

SAMPLING/COLLECTION CHARGE: $
POSSIBLE SAMPLE HAZARDS:
COMMENTS:

Arrival Temp. 2.6°C DSB

D.O. NUMBER: 227/061 INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).*
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. – THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM – 3:30 PM).*

FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION:

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: Lynell Goodwin	REC'D BY: D Hamell	COMPANY/COMMAND: PWC	DATE/TIME: 2/12/97 1330
RELINQUISHED BY: D Hamell	REC'D BY: [illegible]	COMPANY/COMMAND: PWC	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CONTINUATION SHEET

SHEET 2 OF 2

P.O.C.: Douglas Kirk
COMMAND: Oceana NAS

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002B(1	578	Feeds	START	2/11/97	11:00 AM	G	HY	L	1	1	TOXICITY		97-1624		4°C
0002B5			STOP								m+/CN				
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												

COMMENTS:

Arrival Temp. 2.0°C

D.O. NUMBER:
CONTRACT LAB:
CONTRACT NO.(S):
INIT.:
DATE:
OFFICIAL USE ONLY

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).**
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. – THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).*

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION:
HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: Gail Goodwell	REC'D BY: D Hamell	COMPANY/COMMAND: BES Inc	DATE/TIME: 2/12/97 1330
RELINQUISHED BY: D Hamell	REC'D BY: [illegible]	COMPANY/COMMAND: [illegible]	DATE/TIME: 2/12/97 1405
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

#578

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility OLD DOMINION UNIVERSITY

Address DEPT. OF CIVIL & ENVIRONMENTAL ENG.
KDH 135 NORFOLK VA 23529-0241

County _____ Pipe/Outfall/Location _____

NPDES# _____ Instream Waste Conc _____

Sample collected by (print&sign) _____ Affiliation _____

Type of sample ✓ (Grab): Date 2/11/97 Time 11:00 AM

_____ (Composite): From Date _____ Time _____

To Date _____ Time _____

Subsamples comprising composite:

Number Feed S. Frequency of collection _____ Volume 2 L.

*Temperature of sample in sample collection device 28.1°C

Final temperature of effluent at sample collection point _____

*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____

***It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)**

Is the sample chlorinated? NA dechlorinated? _____ If so, how? _____

Permit with interim chlorine limit? _____ If yes – limit (mg/L) _____

Field pH 6.77 Field Total Residual Chlorine NA

Comments/Sample description _____

Type of test(s) to be performed MYSID SHRIMP & CYPRINODON VARIEGATUS ACUTE LC50

(Specify organisms) _____

Method of shipment Bayside

Print & Sign Names

1. Relinquished by H. YANG Date 2/12/97 Time 9:00 AM
   Received by [signature] Date 2-12-97 Time 10:00 A.M.
2. Relinquished by [signature] Date 2-12-97 Time 10:15 A.M.
   Received by [signature] Date 2-12-97 Time 10:15
   Relinq by [signature] 2-12-97 1405
   Rcd by [signature] 2/12/97 1405

FOR REED LAB USE ONLY

JRA# 97-1624 Arrival Temperature 2.0C On ice? yes

Color light tan Odor yeast Solids none

pH 7.29 DO (mg/L) 8.2 Conductivity (µmhos/cm) 1700 @ 19.2°C

Salinity (ppt) 1 TRC (mg/L) N/A Method N/A

Rev 5/15/94

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-1624

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: 8 Feet S.

ORGANISM SOURCE: ABS JRA BATCH#: C202 HATCH DATE: 2/6/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%) 0	24	48			pH (Day 0: 6.0 - 9.0) 0	24	48			DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C) 0	24	48					TEMPERATURE (19 - 21°C) 0	24	48			SALINITY (19 - 21ppt) 0	END
HOURS⇒																									
0	A	10	10	10			8.66	8.42	8.30			7.5	7.7	8.4					20.3	19.5	20.3			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.62	7.92	7.90			7.7	3.0	5.1					20.2	19.5	20.3			20	20
100	B	10	10	10																					
12.5	A	10	10	9			8.50	7.94	7.84			7.7	1.5	3.3					20.2	19.5	20.3			20	20
85	B	10	10	9																					
25	A	10	10	9			8.37	7.91	7.88			7.8	1.2	0.5					20.0	19.5	20.3			20	20
95	B	10	10	10																					
50	A	10	10	0			8.08	7.87	8.12			8.1	0.9	0.1					19.7	19.5	20.3			20	20
0	B	10	10	0																					
100	A	10	10	0			7.63	7.92	8.15			8.3	0.7	<0.1					19.2	19.5	20.3			20	20
0	B	10	10	0																					
INIT		DB	LPG	LDG																					
DATE 19 97		2/12	2/13	2/14																					
TIME		1645	1630	1705																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

TRIMMED SPEARMAN-KARBER METHOD. VERSION 1.5

LC50 = 31%

DATE: 2/12/97 TEST NUMBER: 97-1624 DURATION: 48 hours
TOXICANT : Feed S.
SPECIES: C. variegatus

RAW DATA:

Concentration (%)	Number Exposed	Mortalities
.00	20	0
6.25	20	0
12.50	20	3
25.00	20	1
50.00	20	20
100.00	20	20

SPEARMAN-KARBER TRIM: .00%

SPEARMAN-KARBER ESTIMATES: LC50: 30.78
95% LOWER CONFIDENCE: 26.99
95% UPPER CONFIDENCE: 35.10

NOTE: MORTALITY PROPORTIONS WERE NOT MONOTONICALLY INCREASING.
ADJUSTMENTS WERE MADE PRIOR TO SPEARMAN-KARBER ESTIMATION.

---

cute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-1624

REED & ASSOCIATES

NPDES#: N/A CLIENT: Olegna OUTFALL: 8 Feed S.

ORGANISM SOURCE: ABS JRA BATCH#: M442 HATCH DATE: 2/8/97

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 80%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.66	8.31	8.03			7.5	6.4	6.5					20.3	20.0	20.6			20	20
100	B	10	10	10																					
6.25	A	10	10	6			8.62	8.11	7.90			7.7	4.0	4.8					20.2	20.0	20.6			20	20
40	B	10	3	2																					
12.5	A	10	4	1			8.50	8.09	7.84			7.7	1.5	1.5					20.2	20.0	20.6			20	20
5	B	10	4	0																					
25	A	10	5	0			8.37	8.10	8.02			7.8	1.0	0.2					20.0	20.0	20.6			20	20
5	B	10	7	1																					
50	A	10	0	—			8.08	8.10	—			8.1	0.9	—					19.7	20.0	—			20	20
0	B	10	0	—																					
100	A	10	0	—			7.63	7.92	—			8.3	0.7	—					19.2	20.0	—			20	20
0	B	10	0	—																					
INIT		DSB	LOC	DSB																					
DATE 1997		2/12	2/13	2/14																					
TIME		1645	1600	1602																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

GENERAL COMMENTS

JRA# 97-1624

REED & ASSOCIATES

NPDES#: Nit CLIENT: Oceana ODU OUTFALL: S Fed S.

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
2/12/97	0	2/11/97 1100	2/12/97	19.2	7.63	/	8.3	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	Date (1997)	2/12	2/13	2/13	2/14				
Method	Method	Method	Time	1718	0850	1645	0859				
Minutes	Amount	Amount	Init	LDC	LDC	LDC	LDC				

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
2/12/97	0	2/12/97	20.3	8.66	7.5	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (%) mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (%) mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute to 1000
6.25			62.5	
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DB
NUMBER OF ORGANISMS	DB
STATISTICAL ANALYSES	DB

ANALYST SIGNATURES	INITIALS
	DB

TEST CHAMBER SIZE: 250mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	026
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	~~Baxter~~ VWR	digi-thermo	~~10146203~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

ACUTE TOXICITY TEST RESULTS

60 ppm AFFF

MARCH 25, 1997

April 3, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-084
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 679
Sample ID: A-1
JRA ID: 97-3354

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverly E. Blanchard
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-1 JRA #: 97-3354

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:30
Test End:	3/28/97	16:04

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.02 - 8.15	8.24 - 8.44
	Adjusted	N/A	

JRA #: 97-3354 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.2 - 9.0	6.6 - 8.0

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3354 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/26/97		
	Result (mg/L)	0.09		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-1 JRA #: 97-3354

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:35
Test End:	3/28/97	16:19

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.02 - 8.19	8.25 - 8.44
	Adjusted	N/A	

JRA #: 97-3354 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.6 - 9.0	6.6 - 8.2

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3354 Test Type&Organism: Acute (*Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/31/97		
Result (mg/L)		>40		
QC Range (mg/L)		2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

A-1

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		
3/26/97	>100	>100		

PWC #679

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility ODU

Address Dept. of Civil & Environ. Eng. ODU
Norfolk, VA 23508

County _____ Pipe/Outfall/Location _____

NPDES# _____ Instream Waste Conc _____

Sample collected by (print&sign) yang Affiliation _____

Type of sample ✓ (Grab): Date 03/25/97 Time 9:00 PM

_____ (Composite): From Date _____ Time _____

To Date _____ Time _____

Subsamples comprising composite:

Number A-1, 8 Hr. Frequency of collection _____ Volume 2 L.

*Temperature of sample in sample collection device 25.0°C

Final temperature of effluent at sample collection point _____

*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____

*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)

Is the sample chlorinated? No. dechlorinated? _____ If so, how? _____

Permit with interim chlorine limit? No. If yes – limit (mg/L) _____

Field pH 7.51 Field Total Residual Chlorine _____

Comments/Sample description A-1. 8 Hr.

Type of test(s) to be performed Acute Toxicity Testing

(Specify organisms) Cyprinodon Variegatus & Mysid Shrimp

Method of shipment Rad

Print & Sign Names

1. Relinquished by -yang Date 03/25/97 Time 9:00 PM
   Received by Keith Crafel Date 3-26-97 Time 11:00
2. Relinquished by Keith Crafel Date 3-26-97 Time 11:10
   Received by Arthur Mullen Date 3/26/97 Time 1125 #679
   See PWC C.O.C

FOR REED LAB USE ONLY

JRA# 97-3354 Arrival Temperature 2.4°C On ice? yes

Color tan Odor earthy Solids none

pH 7.92 DO (mg/L) 9.0 Conductivity (µmhos/cm) 1800 @ 19.2°C

Salinity (ppt) 1 TRC (mg/L) — Method —

cute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3354

REED & ASSOCIATES

IPDES#: 1.1A CLIENT: Ocean ODU OUTFALL: A-1

ORGANISM SOURCE: ABS JRA BATCH#: C206 HATCH DATE: 3/22/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.25	8.28			6.6	7.7	8.2					20.5	19.5	19.7			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.43	8.27	8.28			7.3	7.8	8.0					20.5	19.5	19.7			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.41	8.26	8.28			7.4	7.7	8.1					20.4	19.5	19.7			20	20
100	B	10	10	10																					
25	A	10	10	10			8.36	8.23	8.27			7.6	7.7	8.1					20.4	19.5	19.7			20	20
100	B	10	10	10																					
50	A	10	10	10			8.24	8.18	8.25			8.1	7.7	8.1					20.2	19.5	19.7			20	20
100	B	10	10	10																					
100	A	10	10	10			8.02	8.05	8.19			9.0	7.6	8.0					19.2	19.5	19.7			20	20
100	B	10	10	10																					

INIT	DSB	DSB	DSB		
DATE 1997	3/26	3/27	3/28		
TIME	1635	1604	1619		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

ite *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3354

REED & ASSOCIATES

PDES#: NIA CLIENT: Ocean ODU OUTFALL: A.1

RGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M454 HATCH DATE: 3/25-26/97 1430 0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.28	8.24			6.6	7.8	8.0					20.5	20.1	20.1			20	20
100	B	10	10	10																					
6.25	A	10	10	9			8.43	8.26	8.19			7.3	7.5	7.3					20.5	20.1	20.1			20	20
95	B	10	10	10																					
12.5	A	10	10	10			8.41	8.26	8.22			7.4	7.5	7.4					20.4	20.1	20.1			20	20
100	B	10	10	10																					
25	A	10	10	10			8.36	8.24	8.21			7.6	7.6	7.3					20.4	20.1	20.1			20	20
100	B	10	10	10																					
50	A	10	10	10			8.24	8.18	8.20			8.1	7.6	7.4					20.2	20.1	20.1			20	20
100	B	10	10	10																					
100	A	10	10	10			8.02	8.06	8.15			9.0	7.5	7.2					19.2	20.1	20.1			20	20
100	B	10	10	10																					
INIT		DSS	DSS	DSS																					
DATE 1997		3/26	3/27	3/28																					
TIME		1630	1639	1601																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

GENERAL COMMENTS

JRA# 97-3354

REED & ASSOCIATES

NPDES#: N/A CLIENT: Ocean Ocu OUTFALL: A-1

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/26/97	0	3/25/97 2100	3/26/97	19.2	8.02	/	9.0	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	Date (1997)	3/26	3/27	3/27	3/28			
Method	Method	Method	Time	1700	0950	1700	1020			
Minutes	Amount	Amount	Init	DSB	LXG	LXG	LXG			

DILUENT: (20ppt Forty Fathoms) 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/26/97	0	3/26/97	20.5	8.44	6.6	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (%/mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (%/mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute to 1000
6.25	↓	↓	62.5	↓
12.5	↓	↓	125	↓
25	↓	↓	250	↓
50	↓	↓	500	↓
100	↓	↓	1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250ml TYPE: Polystyrene VOLUME OF TEST SOLUTION: 200ml

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB LXG @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Fisher~~ VWR	digi-thermo	@DSB ~~1016303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	321A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

April 3, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-084
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 678
Sample ID: A-2
JRA ID: 97-3353

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverly E. Blanchard
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-2 JRA #: 97-3353

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:30
Test End:	3/28/97	16:06

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.04 - 8.18	8.24 - 8.44
	Adjusted	N/A	

JRA #: 97-3353 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.4 - 9.0	6.6 - 8.0

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3353 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/26/97		
Result (mg/L)		0.09		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-2 JRA #: 97-3353

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:35
Test End:	3/28/97	16:20

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.04 - 8.20	8.25 - 8.44
	Adjusted	N/A	

JRA #: 97-3353 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.6 - 9.0	6.6 - 8.2

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3353 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/31/97		
Result (mg/L)		>40		
QC Range (mg/L)		2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

A-2

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		
3/26/97	>100	>100		

PWC #678

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility ODU

Address Dept. Civil & Environ. Eng. ODU.
Norfolk. VA 23508

County _____ Pipe/Outfall/Location _____

NPDES# _____ Instream Waste Conc _____

Sample collected by (print&sign) yang Affiliation _____

Type of sample ✓ (Grab): Date 03/25/97 Time 9:00 PM.

_____ (Composite): From Date _____ Time _____

To Date _____ Time _____

Subsamples comprising composite:

Number A-2. 8Hr Frequency of collection _____ Volume 2L.

*Temperature of sample in sample collection device 25.0°C.

Final temperature of effluent at sample collection point _____

*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____

*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)

Is the sample chlorinated? No. dechlorinated? _____ If so, how? _____

Permit with interim chlorine limit? No. If yes – limit (mg/L) _____

Field pH 7.56. Field Total Residual Chlorine _____

Comments/Sample description A-2. 8Hr.

Type of test(s) to be performed Acute Toxicity Testing

(Specify organisms) Cyprinodon Variegatus & Mysid Shrimp

Method of shipment Reed

Print & Sign Names

1. Relinquished by yang. Date 03/25/97 Time 9:00 PM
   Received by [signature] Date 3-26-97 Time 11:00
2. Relinquished by [signature] Date 3-26-97 Time 11:10
   Received by [signature] Date 3/26/97 Time 1125 #678
   for PWC C-02

FOR REED LAB USE ONLY

JRA# 97-3353 Arrival Temperature 2.4°C On ice? yes

Color tan Odor earthy Solids none

pH 7.96 DO (mg/L) 8.9 Conductivity (µmhos/cm) 1800 @ 19.3 °C

Salinity (ppt) 1 TRC (mg/L) — Method —

ute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3353

REED & ASSOCIATES

PDES#: 111A CLIENT: Oceana DDU OUTFALL: A-2

RGANISM SOURCE: ABS JRA BATCH#: C206 HATCH DATE: 3/22/97

Conc % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.25	8.28			6.6	7.7	8.2					20.5	19.5	19.7			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.44	8.23	8.19			7.2	7.7	8.2					20.4	19.5	19.7			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.42	8.23	8.29			7.4	7.8	8.1					20.4	19.5	19.7			20	20
100	B	10	10	10																					
25	A	10	10	10			8.31	8.22	8.29			7.5	7.8	8.1					20.3	19.5	19.7			20	20
100	B	10	10	10																					
50	A	10	10	10			8.25	8.15	8.27			7.9	7.7	8.2					20.0	19.5	19.7			20	20
100	B	10	10	10																					
100	A	10	10	10			8.04	8.04	8.20			9.0	7.6	8.1					19.3	19.5	19.7			20	20
100	B	10	10	10																					
INIT		DSB	DSB	DSB																					
DATE 1997		3/26	3/27	3/28																					
TIME		1635	1645	1620																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

ute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3353

REED & ASSOCIATES

PDES#: N/A CLIENT: Ocean ODU OUTFALL: A-2

RGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M454 HATCH DATE: 3/25-26/97 1430-0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.28	8.24			6.6	7.8	8.0					20.5	20.1	20.1			20	20
100	B	10	10	10																					
0.25	A	10	10	10			8.44	8.23	8.21			7.2	7.7	7.2					20.4	20.1	20.1			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.42	8.23	8.21			7.4	7.8	7.2					20.4	20.1	20.1			20	20
100	B	10	10	10																					
25	A	10	10	10			8.31	8.22	8.25			7.5	7.7	7.5					20.3	20.1	20.1			20	20
100	B	10	10	10																					
50	A	10	10	10			8.25	8.15	8.22			7.9	7.8	7.5					20.0	20.1	20.1			20	20
100	B	10	10	10																					
100	A	10	10	10			8.04	8.04	8.18			7.0	7.6	7.4					19.3	20.1	20.1			20	20
100	B	10	10	10																					
INIT		DB	DB	DB																					
DATE 1997		3/26	3/27	3/28																					
TIME		1630	1645	1600																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" *C. variegatus* " "

GENERAL COMMENTS

JRA# 97-3353

REED & ASSOCIATES

NPDES#: N/A CLIENT: Ocean Ocu OUTFALL: A-2

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/26/97	0	3/25/97 2100	3/26/97	19.3	8.04	/	9.0	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

	DO Adj.	pH Adj.	TRC Adj.	Feedings (Mysid)						
Date				Date (1997)	3/26	3/27	3/27	3/28		
Method				Time	1700	0950	1700	1020		
Minutes		Amount	Amount	Init	DSB	LDG	LDG	LDG		

DILUENT: (20ppt Forty Fathoms) 20ppt Hawaiian Marine Mix Other_____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/26/97	0	3/26/97	20.5	8.44	6.6	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (%/mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (%/mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250ml TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB & RG @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~Y946303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

April 3, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-084
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 677
Sample ID: A-3
JRA ID: 97-3352

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Drury E. Blanchard

Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-3 JRA #: 97-3352

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:30
Test End:	3/28/97	16:07

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.07 - 8.16	8.24 - 8.44
	Adjusted	N/A	

JRA #: 97-3352 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.3 - 9.0	6.6 - 8.0

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3352 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/26/97		
Result (mg/L)		0.09		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: A-1 JRA #: 97-3352

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:35
Test End:	3/28/97	16:21

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.08 - 8.19	8.25 - 8.44
	Adjusted	N/A	

JRA #: 97-3352 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.7 - 9.0	6.6 - 8.2

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3352 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50 >100%

Survival (NOEC) _____ (LOEC) _____
Normal Distribution (yes/no) _____
Homogeneous Variance (yes/no) _____

Growth or Reproduction (NOEC) _____ (LOEC) _____
Normal Distribution (yes/no) _____
Homogeneous Variance (yes/no) _____

Reference Toxicant Test Date 3/31/97
Result (mg/L) >40
QC Range (mg/L) 2 thru 36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

_____
_____
_____
_____
_____

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

A-3

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		
3/26/97	>100	>100		

PWC # 677

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility ODU

Address Dept. Civil & Environ. Eng. ODU.
Norfolk, VA 23508

County _____ Pipe/Outfall/Location _____

NPDES# _____ Instream Waste Conc _____

Sample collected by (print&sign) Yang Affiliation _____

Type of sample ✓ (Grab): Date 03/25/97 Time 9:00 PM

_____ (Composite): From Date _____ Time _____

To Date _____ Time _____

Subsamples comprising composite:

Number A-3. 8Hr Frequency of collection _____ Volume 2L.

*Temperature of sample in sample collection device 25.0°C

Final temperature of effluent at sample collection point _____

*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____

*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)

Is the sample chlorinated? No. dechlorinated? _____ If so, how? _____

Permit with interim chlorine limit? No. If yes – limit (mg/L) _____

Field pH 7.59 Field Total Residual Chlorine _____

Comments/Sample description A-3. 8Hr.

Type of test(s) to be performed Acute Toxicity Testing

(Specify organisms) Cyprinodon Variegatus & Mysid Shrimp.

Method of shipment Reed

Print & Sign Names

1. Relinquished by Yang Date 03/25/97 Time 9:00 PM.
   Received by Keith Cuff Date 3-26-97 Time 11:00 AM
2. Relinquished by Keith Cuff Date 3-26-97 Time 11:10 AM
   Received by Arthur Miller Date 3/26/97 Time 1125 #677
   See PWC C-O-C

FOR REED LAB USE ONLY

JRA# 97-3352 Arrival Temperature 2.4°C On ice? yes

Color tan Odor earthy Solids none

pH 8.03 DO (mg/L) 8.9 Conductivity (µmhos/cm) 1800 @ 19.4°C

Salinity (ppt) 1 TRC (mg/L) — Method —

ute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3352

REED & ASSOCIATES

PDES#: N/A CLIENT: Ocean DDU OUTFALL: A-3

RGANISM SOURCE: ABS JRA BATCH#: C206 HATCH DATE: 3/22/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.25	8.28			6.6	7.7	8.2					20.5	19.5	19.7			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.42	8.29	8.28			7.2	7.8	8.2					20.4	19.5	19.7			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.40	8.28	8.29			7.4	7.7	8.1					20.4	19.5	19.7			20	20
100	B	10	10	10																					
25	A	10	10	10			8.32	8.25	8.26			7.7	7.7	8.1					20.3	19.5	19.7			20	20
100	B	10	10	10																					
50	A	10	8	8			8.21	8.17	8.24			8.1	7.4	8.0					20.2	19.5	19.7			20	20
90	B	10	10	10																					
100	A	10	10	10			8.09	8.08	8.19			9.0	7.7	8.0					19.4	19.5	19.7			20	20
80	B	10	6	6																					

INIT	DSB	DSB	DSB		
DATE 1997	3/26	3/27	3/28		
TIME	1635	1647	1621		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

ıte *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3352

REED & ASSOCIATES

'DES#: N/A CLIENT: Oceana ODU OUTFALL: A-3

RGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M454 HATCH DATE: 3/25-26/97 1430-0800

'onc (%) / Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.28	8.24			6.6	7.8	8.0					20.5	20.1	20.1			20	20
100	B	10	10	10																					
2.25	A	10	10	10			8.42	8.28	8.24			7.2	7.7	7.7					20.4	20.1	20.1			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.40	8.26	8.22			7.4	7.6	7.4					20.4	20.1	20.1			20	20
100	B	10	10	10																					
25	A	10	10	10			8.32	8.23	8.21			7.7	7.5	7.4					20.3	20.1	20.1			20	20
100	B	10	10	10																					
50	A	10	10	10			8.21	8.18	8.20			8.1	7.5	7.3					20.2	20.1	20.1			20	20
100	B	10	10	10																					
100	A	10	10	10			8.09	8.07	8.16			9.0	7.7	7.3					19.4	20.1	20.1			20	20
100	B	10	10	10																					
INIT		DSB	DSB	DSB																					
DATE 1997		3/26	3/27	3/28																					
TIME		1630	1647	1607																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

" C. variegatus " "

GENERAL COMMENTS

JRA# 97-3352

REED & ASSOCIATES

NPDES#: N/A CLIENT: Ocean ODU OUTFALL: A-3

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/26/97	0	3/25/97 2100	3/26/97	19.4	8.09	/	9.0	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	1997 Date	3/26	3/27	3/27	3/28			
Method	Method	Method	Time	1700	0950	1700	1020			
Minutes	Amount	Amount	Init	DSB	LDG	LDG	LDG			

DILUENT: 20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/26/97	0	3/26/97	20.5	8.44	6.6	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250ml TYPE: Polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB ~~2~~ 2G @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1046303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

April 3, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-084
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 676
Sample ID: B-1
JRA ID: 97-3351

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverly E. Blanchard
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-1 JRA #: 97-3351

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:30
Test End:	3/28/97	16:09

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.05 - 8.14	8.24 - 8.44
	Adjusted	N/A	

JRA #: 97-3351 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	6.8 - 9.2	6.6 - 8.0

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3351 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/26/97		
	Result (mg/L)	0.09		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147-	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-1 JRA #: 97-3351

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:35
Test End:	3/28/97	16:26

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.01 - 8.17	8.25 - 8.44
	Adjusted	N/A	

JRA #: 97-3351 Test Type&Organism: Acute (*Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.6 - 9.2	6.6 - 8.2

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3351 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/31/97		
Result (mg/L)		>40		
QC Range (mg/L)		2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

B-1

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		
3/26/97	>100	>100		

PWC# 676

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility ODU

Address Dept. Civil & Environ. Eng. ODU.
Norfolk. VA 23508.

County _____ Pipe/Outfall/Location _____

NPDES# _____ Instream Waste Conc _____

Sample collected by (print&sign) yang Affiliation _____

Type of sample ✓ (Grab): Date 03/25/97 Time 9:00 PM

_____ (Composite): From Date _____ Time _____

To Date _____ Time _____

Subsamples comprising composite:

Number B-1. 8Hr Frequency of collection _____ Volume 2L.

*Temperature of sample in sample collection device 25.0°C.

Final temperature of effluent at sample collection point _____

*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____

*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)

Is the sample chlorinated? No. dechlorinated? _____ If so, how? _____

Permit with interim chlorine limit? No. If yes – limit (mg/L) _____

Field pH ~~7.50~~ 7.64 Field Total Residual Chlorine _____

Comments/Sample description B-1. 8Hr.

Type of test(s) to be performed Acute Toxicity Testing

(Specify organisms) Cyprinodon Variegatus & Mysid Shrimp.

Method of shipment Reed

Print & Sign Names

1. Relinquished by yang Date 03/25/97 Time 9:00 PM.
   Received by [signature] Date 3-26-97 Time 11:00 A.M.
2. Relinquished by [signature] Date 3-26-97 Time 11:10 A.M.
   Received by [signature] Date 3/26/97 Time 1125 676
   See PWC C-OC

FOR REED LAB USE ONLY

JRA# 97-3351 Arrival Temperature 2.4°C On ice? yes

Color tan Odor earthy Solids none

pH 7.50 DO (mg/L) 8.8 Conductivity (µmhos/cm) 1900 @ 20.0°C

Salinity (ppt) 1 TRC (mg/L) — Method —

:ute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3351

REED & ASSOCIATES

PDES#: 1.1A CLIENT: Ocean ODU OUTFALL: B-1

RGANISM SOURCE: ABS JRA BATCH#: C206 HATCH DATE: 3/22/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.25	8.28			6.6	7.7	8.2					20.5	19.5	19.7			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.63	8.21	8.24			7.9	7.4	7.8					20.5	19.5	19.7			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.49	8.22	8.23			7.8	7.4	7.6					20.5	19.5	19.7			20	20
100	B	10	10	10																					
25	A	10	10	10			8.42	8.21	8.21			8.0	7.6	7.5					20.4	19.5	19.7			20	20
100	B	10	10	10																					
50	A	10	10	10			8.30	8.16	8.19			8.3	7.7	7.3					20.3	19.5	19.7			20	20
100	B	10	10	10																					
100	A	10	10	10			8.07	8.01	8.17			9.2	7.6	7.8					20.0	19.5	19.7			20	20
100	B	10	10	10																					

INIT	DSB	DSB	DSB		
DATE 1997	3/26	3/27	3/28		
TIME	1635	1625	1626		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

ute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3351

REED & ASSOCIATES

PDES#: NIA CLIENT: Ocean ODU OUTFALL: B-1

RGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M454 HATCH DATE: 3/25-26/97 1420-0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.28	8.24			6.6	7.8	8.0					20.5	20.1	20.1			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.63	8.25	8.16			7.9	7.4	7.4					20.5	20.1	20.1			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.49	8.24	8.18			7.8	7.3	7.1					20.5	20.1	20.1			20	20
100	B	10	10	10																					
25	A	10	10	10			8.42	8.23	8.16			8.0	7.4	6.8					20.4	20.1	20.1			20	20
100	B	10	10	10																					
50	A	10	10	10			8.30	8.16	8.15			8.3	7.4	6.7					20.3	20.1	20.1			20	20
100	B	10	10	10																					
100	A	10	10	10			8.07	8.05	8.14			7.2	7.4	6.8					20.0	20.1	20.1			20	20
100	B	10	10	10																					

INIT		DS	DS	DS	
DATE 1997		3/26	3/27	3/28	
TIME		1630	1450	1609	

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " " GENERAL COMMENTS

JRA# 97-3351

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana OSU OUTFALL: B-1

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/26/97	0	3/25/97 2100	3/26/97	20.0	8.07	/	9.2	/	21	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	Date (1997)	3/26	3/27	3/27	3/28			
Method	Method	Method	Time	1700	0950	1700	1020			
Minutes	Amount	Amount	Init	DSB	LOG	LOG	LOG			

DILUENT: (20ppt Forty Fathoms) 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/26/97	0	3/26/97	20.5	8.44	6.6	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (%/mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (%/mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250ml TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	~~RG~~
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	~~Baxter~~ VWR	digi-thermo	~~1946303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

April 3, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-084
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 675
Sample ID: B-2
JRA ID: 97-3350

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverly E. Blanchard
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-2 JRA #: 97-3350

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:30
Test End:	3/28/97	16:13

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.93 - 8.07	8.24 - 8.44
	Adjusted	N/A	

JRA #: 97-3350 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.5 - 9.0	6.6 - 8.0

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3350 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/26/97		
Result (mg/L)		0.09		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-2 JRA #: 97-3350

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:35
Test End:	3/28/97	16:30

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.93 - 8.16	8.25 - 8.44
	Adjusted	N/A	

JRA #: 97-3350 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.5 - 9.0	6.6 - 8.2

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3350 Test Type&Organism: Acute (*Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/31/97		
Result (mg/L)		>40		
QC Range (mg/L)		2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

B-2

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		
3/26/97	>100	>100		

PWC #675

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility ODU

Address Dept. Civil & Environ. Eng. ODU.
Norfolk, VA 23508.

County _____ Pipe/Outfall/Location _____

NPDES# _____ Instream Waste Conc _____

Sample collected by (print&sign) yang Affiliation _____

Type of sample ✓ (Grab): Date 03/25/97 Time 9:00PM

_____ (Composite): From Date _____ Time _____

To Date _____ Time _____

Subsamples comprising composite:

Number B-2 8Hr. Frequency of collection _____ Volume 2L.

*Temperature of sample in sample collection device 25.0°C

Final temperature of effluent at sample collection point _____

*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____

*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)

Is the sample chlorinated? No. dechlorinated? _____ If so, how? _____

Permit with interim chlorine limit? No If yes – limit (mg/L) _____

Field pH 7.63. Field Total Residual Chlorine _____

Comments/Sample description B-2. 8Hr.

Type of test(s) to be performed Acute Toxicity Testing

(Specify organisms) Cyprinodon variegatus & Mysid shrimp

Method of shipment Reed

Print & Sign Names

1. Relinquished by yang Date 03/25/97 Time 9:00PM
   Received by [signature] Date 3-26-97 Time 11:00 A.M.
2. Relinquished by [signature] Date 3-26-97 Time 11:10 A.M.
   Received by [signature] Date 3/26/97 Time 11 25 #675
   See PWC C-OC-

FOR REED LAB USE ONLY

JRA# 97-3350 Arrival Temperature 2.4C On ice? yes

Color tan Odor earthy Solids none

pH 7.78 DO (mg/L) 9.0 Conductivity (µmhos/cm) 1900 @ 20.0 °C

Salinity (ppt) 1 TRC (mg/L) – Method –

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3350

REED & ASSOCIATES

NPDES#: 111A CLIENT: Ocean DDU OUTFALL: B-2

ORGANISM SOURCE: ABS JRA BATCH#: C206 HATCH DATE: 3/22/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.25	8.28			6.6	7.7	8.2					20.5	19.5	19.7			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.40	8.19	8.18			7.2	7.1	7.4					20.5	19.5	19.7			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.35	8.25	8.22			7.3	7.4	7.4					20.6	19.5	19.7			20	20
100	B	10	10	10																					
25	A	10	10	10			8.27	8.22	8.24			7.4	7.5	7.4					20.6	19.5	19.7			20	20
100	B	10	10	10																					
50	A	10	10	10			8.14	8.16	8.21			8.0	7.5	7.4					20.4	19.5	19.7			20	20
100	B	10	10	10																					
100	A	10	10	10			7.93	8.00	8.16			9.0	7.5	7.8					20.0	19.5	19.7			20	20
100	B	10	10	10																					
INIT		DSB	DSB	DSB																					
DATE 1997		3/26	3/27	3/28																					
TIME		1635	1630	1630																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

.cute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3350

REED & ASSOCIATES

NPDES#: NIA CLIENT: Ocean ODU OUTFALL: B-2

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M464 HATCH DATE: 3/25-26/97 1430-0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.28	8.24			6.6	7.8	8.0					20.5	20.1	20.1			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.40	8.25	8.17			7.2	7.3	7.3					20.5	20.1	20.1			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.35	8.25	8.16			7.3	7.3	6.9					20.4	20.1	20.1			20	20
100	B	10	10	10																					
25	A	10	10	10			8.27	8.22	8.13			7.4	7.4	6.6					20.6	20.1	20.1			20	20
100	B	10	10	10																					
50	A	10	10	10			8.14	8.16	8.13			8.0	7.4	6.6					20.4	20.1	20.1			20	20
100	B	10	10	10																					
100	A	10	10	10			7.93	8.03	8.07			9.0	7.5	7.1					20.0	20.1	20.1			20	20
100	B	10	10	10																					

INIT		DS	DS	DS	
DATE 1997		3/26	3/27	3/28	
TIME		1630	1700	1613	

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

GENERAL COMMENTS

JRA# 97-3350

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: B-2

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/26/97	0	3/25/97 2100	3/26/97	20.0	7.93	/	9.0	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date_____ Date_____ Date_____ 1997 Date 3/26 3/27 3/27 3/28
Method_____ Method_____ Method_____ Time 1700 0950 1700 1020
Minutes_____ Amount_____ Amount_____ Init DSB LDG LDG LDG

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other_____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/26/97	0	3/26/97	20.5	8.44	6.6	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (%/mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (%/mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250ml TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB ~~2~~ 26 @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1046303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	321A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

April 3, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-084
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 674
Sample ID: B-3
JRA ID: 97-3349

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverly E. Blanchard
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-3 JRA #: 97-3349

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:30
Test End:	3/28/97	16:20

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.91 - 8.14	8.24 - 8.44
	Adjusted	N/A	

JRA #: 97-3349 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.3 - 8.9	6.6 - 8.0

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3349 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/26/97		
Result (mg/L)		0.09		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: B-3 JRA #: 97-3349

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:35
Test End:	3/28/97	16:37

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.91 - 8.17	8.25 - 8.44
	Adjusted	N/A	

JRA #: 97-3349 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.8 - 8.9	6.6 - 8.2

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3349 Test Type&Organism: Acute (*Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/31/97		
Result (mg/L)		>40		
QC Range (mg/L)		2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

B-3

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		
3/26/97	>100	>100		

PWC# 674

Toxicity Test Sample Chain of Custody
(Please complete all information)

REED & ASSOCIATES

Facility ODU.

Address Dept. Civil & Environ. Eng. ODU.
Norfolk. VA 23508

County _____ Pipe/Outfall/Location _____

NPDES# _____ Instream Waste Conc _____

Sample collected by (print&sign) yang Affiliation _____

Type of sample ✓ (Grab): Date 03/25/97 Time 9:00PM

_____ (Composite): From Date _____ Time _____

To Date _____ Time _____

Subsamples comprising composite:

Number B-3. 8Hr Frequency of collection _____ Volume 2L.

*Temperature of sample in sample collection device 25.0°C

Final temperature of effluent at sample collection point _____

*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____

***It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)**

Is the sample chlorinated? No. dechlorinated? _____ If so, how? _____

Permit with interim chlorine limit? No. If yes – limit (mg/L) _____

Field pH 7.50 Field Total Residual Chlorine _____

Comments/Sample description B-3. 8Hr.

Type of test(s) to be performed Acute Toxicity Testing

(Specify organisms) Cyprinodon Variegatus & Mysid shrimp.

Method of shipment Car

Print & Sign Names

1. Relinquished by yang Date 03/25/97 Time 9:00 PM
   Received by [signature] Date 3-26-97 Time 11:00 A.M.
2. Relinquished by [signature] Date 3-26-97 Time 11:10 A.M.
   Received by [signature] Date 3/26/97 Time 1125 674

See PWC C.O.C

FOR REED LAB USE ONLY

JRA# 97-3349 Arrival Temperature 2.4C On ice? yes

Color tan Odor earthy Solids none

pH 7.74 DO (mg/L) 8.8 Conductivity (µmhos/cm) 1900 @ 21 °C

Salinity (ppt) 1 TRC (mg/L) — Method —

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3349

REED & ASSOCIATES

NPDES#: 111A CLIENT: Ocean DDU OUTFALL: B-3

ORGANISM SOURCE: ABS JRA BATCH#: C206 HATCH DATE: 3/22/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48→			0	24	48→					0	24	48			0	END
0	A	10	10	10			8.44	8.25		8.28		6.6	7.7		8.2				20.5	19.5	19.7			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.39	8.26	8.18	8.25		7.1	7.7	7.3	7.8				20.6	19.5	19.7			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.31	8.26	8.15	8.24		7.3	7.7	6.9	7.7				20.6	19.5	19.7			20	20
100	B	10	10	10																					
25	A	10	10	10			8.23	8.23	8.16	8.23		7.5	7.7	6.8	7.6				20.5	19.5	19.7			20	20
100	B	10	10	10																					
50	A	10	10	10			8.14	8.16	8.12	8.20		8.0	7.7	6.6	7.5				20.4	19.5	19.7			20	20
100	B	10	10	10					@LOC																
100	A	10	10	10			7.91	8.04		8.17		8.9	7.8	@LOC	8.0				20.1	19.5	19.7			20	20
100	B	10	10	10																					

INIT	DSB	DSB	DSB		
DATE 1997	3/26	3/27	3/28		
TIME	1635	1634	1637		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3349

NPDES#: N/A CLIENT: Ocean ODU OUTFALL: B-3

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M454 HATCH DATE: 3/25-26/97 1430 0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.28	8.24			6.6	7.8	8.0					20.5	20.1	20.1			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.39	8.27	8.18			7.1	7.4	7.3					20.6	20.1	20.1			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.31	8.25	8.15			7.3	7.4	6.9					20.6	20.1	20.1			20	20
100	B	10	10	10																					
25	A	10	10	10			8.23	8.23	8.16			7.5	7.5	6.8					20.5	20.1	20.1			20	20
100	B	10	10	10																					
50	A	10	10	10			8.14	8.15	8.12			8.0	7.5	6.6					20.4	20.1	20.1			20	20
100	B	10	10	10																					
100	A	10	10	10			7.91	8.04	8.14			8.9	7.7	7.3					20.1	20.1	20.1			20	20
100	B	10	10	10																					

INIT	DB	DB	DB		
DATE 1997	3/26	3/27	3/28		
TIME	1630	1202	1620		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" *C. variegatus* " "

GENERAL COMMENTS

JRA# 97-3349

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana OJU OUTFALL: B-3

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/26/97	0	3/25/97 2100	3/26/97	20.1	7.91	/	8.9	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	Date (1997)	3/26	3/27	3/27	3/28			
Method	Method	Method	Time	1700	0950	1700	1020			
Minutes	Amount	Amount	Init	DSB	LOG	LOG	LOG			

DILUENT: (20ppt Forty Fathoms) 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/26/97	0	3/26/97	20.5	8.44	6.6	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (%/mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (%/mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250ml TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB & LG @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1046303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

April 3, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-084
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 681
Sample ID: Feed S.
JRA ID: 97-3356

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverly E. Blanchard
for Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Feed S. JRA #: 97-3356

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:30
Test End:	3/28/97	15:35

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): All vessels from test initiation

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.30 - 7.89	8.24 - 8.44
	Adjusted	N/A	

JRA #: 97-3356 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	0.2 - 9.0	6.6 - 8.0

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: Spearman-Karber
Growth/Reproduction: N/A

JRA #: 97-3356 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		33%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/26/97		
	Result (mg/L)	0.09		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Feed S. JRA #: 97-3356

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:35
Test End:	3/28/97	15:38

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): All vessels from test initiation

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.30 - 7.86	8.25 - 8.44
	Adjusted	N/A	

JRA #: 97-3356 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	0.1 - 9.0	6.6 - 8.2

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: Spearman-Karber
Growth/Reproduction: N/A

JRA #: 97-3356 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		34%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/31/97		
Result (mg/L)		>40		
QC Range (mg/L)		2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

Feed S.

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	<6.25	31		
2/28/97	Invalid	35		
3/12/97	17.7	52		
3/20/97	19.5	35		
3/26/97	33	34		

PWC# 681

REED & ASSOCIATES

Toxicity Test Sample Chain of Custody
(Please complete all information)

Facility ODU

Address Dept. Civil & Environ. Eng. ODU.
Norfolk. VA 23508

County _____ Pipe/Outfall/Location _____

NPDES# _____ Instream Waste Conc _____

Sample collected by (print&sign) _____ Affiliation _____

Type of sample ✓ (Grab): Date 03/25/97 Time 1:00 PM

_____ (Composite): From Date _____ Time _____

To Date _____ Time _____

Subsamples comprising composite:

Number Feed S. Frequency of collection _____ Volume 2 L.

*Temperature of sample in sample collection device 26.0°C

Final temperature of effluent at sample collection point _____

*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____

*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)

Is the sample chlorinated? No dechlorinated? _____ If so, how? _____

Permit with interim chlorine limit? No. If yes – limit (mg/L) _____

Field pH 6.79 Field Total Residual Chlorine _____

Comments/Sample description Feed S.

Type of test(s) to be performed Acute Toxicity Testing

(Specify organisms) Cyprinodon Variegatus & Mysid Shrimp

Method of shipment Reel

Print & Sign Names

1. Relinquished by yang Date 03/25/97 Time 1:00 PM
   Received by Keith Cantrel Date 3-26-97 Time 11:00 AM
2. Relinquished by Keith Cantrel Date 3-26-97 Time 11:10
   Received by Arthur Miller Date 3/26/97 Time 1125 #681

See PWC C.O.C

FOR REED LAB USE ONLY

JRA# 97-3356 Arrival Temperature 2.4°C On ice? yes

Color tan Odor yeast Solids none

pH 7.17 DO (mg/L) 9.0 Conductivity (µmhos/cm) 1700 @ 19.1 °C

Salinity (ppt) 1 TRC (mg/L) — Method —

Rev. 5 12-94

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CONTINUATION SHEET

SHEET 2 OF 2

P.O.C.: Douglas Kirk
COMMAND: Oceana

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002B4	681	Feed. S	START	3/26/97	1300	G	Y Ang	L	1	1P	Biocassay		97-3356		Ash
0002B5			STOP												
↓	685	DI Water	START	↓	2100	↓	↓	↓	↓	↓	↓		97-3357		↓
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												
			START												
			STOP												

COMMENTS:

D.O. NUMBER:
CONTRACT LAB:
CONTRACT NO.(S):
OFFICIAL USE ONLY
INIT.:
DATE:

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).**
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. -- THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM -- 3:30 PM).*

**FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY. SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: Arthur Miller	REC'D BY: [illegible]	COMPANY/COMMAND: Rec'd	DATE/TIME: 3/26/97 1230
RELINQUISHED BY: [illegible]	REC'D BY: Teresa L Poulin	COMPANY/COMMAND: Rec'd	DATE/TIME: 3/26/97 1320
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

CHAIN-OF-CUSTODY RECORD

& ANALYSIS REQUEST FORM

PWC ENVIRONMENTAL LABORATORY
CODE 930 BLDG Z-140
9742 MARYLAND AVENUE
NORFOLK, VA 23511 - 3095
PH: (757)445-8851 FAX: (757)445-8852

ENVIRONMENTAL

CLIENT INFORMATION

COMPANY/COMMAND: Oceana CODE:
CONTACT: Douglas Kirk
PHONE: 433-2131 EXT: FAX: 433-2719
J.O. #: 1912290
SIGNATURE: on file
PERMIT NO.:

LAB USE ONLY LINE ITEM #	SAMPLE NO	SAMPLE ID/LOCATION	SAMPLE TAKEN	ON DATE	AT TIME	TYPE	SAMPLED BY	MATRIX	PRESERVATIVE	# OF SAMPLES /CONTAINERS	ANALYSIS	FIELD READINGS pH	TEMPERATURE	OTHER	PRESERVATION VERIFIED BY
0002BH 0002BJ	674	B-3	START / STOP	3/25/97	2100	G	Yang	L	1	1P	Bioassay		97-3349		aBr
	675	B-2	START / STOP		2100								97-3350		
	676	B-1	START / STOP		2100								97-3351		
	677	A-3	START / STOP		2100								97-3352		
	678	A-2	START / STOP		2100								97-3353		
	679	A-1	START / STOP		2100								97-3354		
	680	Mix L.RR	START / STOP		1300								97-3355		

TYPE
G - GRAB
CF - COMPOSITE, FLOW
CT - COMPOSITE, TIME

MATRIX
L - LIQUID SW - SWIPE
S - SOLID
GS - GAS
SS - SEMI SOLID

CONTAINER
P - PLASTIC B - BAG A - AMBER(glass)
GL - GLASS C - CARTRIDGE
T - TEFLON TL - TEFLON LINED LID
V - VOA H - HEXANE RINSED

PRESERVATIVE
1 - COOL TO 4 C 5 - HCL, pH<2
2 - HNO3, pH<2 6 - 0.008% Na2S2O3, 4 C
3 - H2SO4, pH<2 7 - FIELD FILTER
4 - NaOH, pH>12 8 - NONE

TURNAROUND (Days): _____ (FOR RUSH TURNAROUND STATE REASON BELOW)

COMMENTS:

REGULATION APPLIED:
RCRA ( ) HRSD ( )
SDWA ( ) TSCA ( )
CWA ( ) PHOTO ( )
CAA ( ) OTHER ( )

SAMPLING/COLLECTION CHARGE: $
POSSIBLE SAMPLE HAZARDS:
COMMENTS:

SAMPLE DISPOSAL: ( )RETURN TO CLIENT ( )DISPOSAL BY LAB

D.O. NUMBER: INIT.:
CONTRACT LAB: DATE:
CONTRACT NO.(S):
OFFICIAL USE ONLY

1. *CUSTOMER IS RESPONSIBLE FOR ALL CHARGES NECESSARY FOR THE PROCESSING AND ANALYSIS OF SAMPLE(S).**
*ALL RUSH SAMPLES ARE SUBJECT TO SURCHARGE.

2. *SAMPLES RECEIVED AFTER 2:00 PM MON. – THURS. AND 1:00 PM ON FRIDAY WILL BE PROCESSED THE NEXT BUSINESS DAY (7:00 AM – 3:30 PM).*

FOR LAB USE ONLY!! CHECK BOX & INITIAL IF OKAY SAMPLES VERIFICATION

HOLDING TIME ( ) CONTAINERS ( ) INITIAL: REJECTED ( ) REASON: INITIAL:

RELINQUISHED BY: Arthur Miller	REC'D BY: [signature]	COMPANY/COMMAND: Reed	DATE/TIME: 3/26/97 1230
RELINQUISHED BY: [signature]	REC'D BY: Theresa G. Pereira	COMPANY/COMMAND: Reed	DATE/TIME: 3/26/97 1320
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:
RELINQUISHED BY:	REC'D BY:	COMPANY/COMMAND:	DATE/TIME:

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97 3356

REED & ASSOCIATES

NPDES#: 111A CLIENT: Oceana ODU OUTFALL: Feed S

ORGANISM SOURCE: ABS JRA BATCH#: C206 HATCH DATE: 3/22/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.25	8.28			6.6	7.7	8.2					20.5	19.5	19.7			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.34	8.09	8.32			7.2	7.7	8.2					20.5	19.5	19.7			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.26	7.83	8.34			7.2	6.0	8.0					20.4	19.5	19.7			20	20
100	B	10	10	10																					
25	A	10	10	10			8.14	8.06	8.24			7.4	7.3	7.7					20.4	19.5	19.7			20	20
95	B	10	10	9																					
50	A	10	10	0			7.88	8.22	8.46			7.7	7.2	7.7					20.2	19.5	19.7			20	20
0	B	10	10	0																					
100	A	10	0	—			7.30	7.86	—			9.0	0.1	—					19.1	19.5	—			20	20
0	B	10	0	—																					

INIT	DS3	DS3	DS3		
DATE 1997	3/26	3/27	3/28		
TIME	1635	1555	1538		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

TRIMMED SPEARMAN-KARBER METHOD. VERSION 1.5

LC50 = 34%

DATE: 3/26/97 TEST NUMBER: 97-3356 DURATION: 48 hours
TOXICANT : Feed S.
SPECIES: C. variegatus

RAW DATA:

Concentration (%)	Number Exposed	Mortalities
.00	20	0
6.25	20	0
12.50	20	0
25.00	20	1
50.00	20	20
100.00	20	20

SPEARMAN-KARBER TRIM: .00%

SPEARMAN-KARBER ESTIMATES: LC50: 34.15
95% LOWER CONFIDENCE: 31.92
95% UPPER CONFIDENCE: 36.54

Acute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3356

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: Feed S.

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M454 HATCH DATE: 3/25-26/97 1430-0800

Conc.(%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.28	8.24			6.6	7.8	8.0					20.5	20.1	20.1			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.34	8.18	8.19			7.2	7.3	8.1					20.5	20.1	20.1			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.26	~~8.23~~ 8.13	8.23			7.2	7.2	8.2					20.4	20.1	20.1			20	20
95	B	10	10	9																					
25	A	10	10	10			8.14	~~7.97~~ 8.23	8.32			7.4	7.2	7.7					20.4	20.1	20.1			20	20
95	B	10	10	9																					
50	A	10	1	0			7.88	7.97	8.53			7.7	5.1	7.9					20.2	20.1	20.1			20	20
0	B	10	1	0																					
100	A	10	0	–			7.30	7.89	–			9.0	0.2	–					19.1	20.1	–			20	20
0	B	10	0	–																					

INIT	DSB	LOG	LOG		
DATE 1997	3/26	3/27	3/28		
TIME	1630	1550	1535		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

LC50 = 33%

TRIMMED SPEARMAN-KARBER METHOD. VERSION 1.5

DATE: 3/26/97 TEST NUMBER: 97-3356 DURATION: 48 hours
TOXICANT : Feed S.
SPECIES: M. bahia

RAW DATA:	Concentration (%)	Number Exposed	Mortalities
	.00	20	0
	6.25	20	0
	12.50	20	1
	25.00	20	1
	50.00	20	20
	100.00	20	20

SPEARMAN-KARBER TRIM: .00%

SPEARMAN-KARBER ESTIMATES: LC50: 32.99
95% LOWER CONFIDENCE: 29.98
95% UPPER CONFIDENCE: 36.29

Acute *Mysidopsis bahia* Toxicity Test

" C. variegatus " "

JRA# 97-3356

GENERAL COMMENTS

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: Feed S

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/26/97	0	3/25/97 1300	3/26/97	19.1	7.30	/	9.0	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	1997 Date	3/26	3/27	3/27	3/28				
Method	Method	Method	Time	1700	0950	1700	1020				
Minutes	Amount	Amount	Init	DSB	LDG	LDG	LDG				

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/26/97	0	3/26/97	20.5	8.44	6.6	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	DSB

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250ml TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB ~~2~~ 26 @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1946203~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

all vessels aerated.

Rev 3/19/96

April 3, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-084
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 680
Sample ID: Mix L. R.R.
JRA ID: 97-3355

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Murrey E. Blanchard

Carol Isenhour
for Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Mix L. R.R. JRA #: 97-3355

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:30
Test End:	3/28/97	16:02

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.98 - 8.24	8.24 - 8.44
	Adjusted	N/A	

JRA #: 97-3355 Test Type&Organism: Acute *Mysidopsis bahia*

RANGE OF CHEMICAL PARAMETERS (Continued)

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.6 - 8.9	6.6 - 8.0

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3355 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/26/97		
Result (mg/L)		0.09		
QC Range (mg/L)		0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: Mix L. R.R. JRA #: 97-3355

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:35
Test End:	3/28/97	16:15

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	7.98 - 8.24	8.28 - 8.44
	Adjusted	N/A	

JRA #: 97-3355 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.5 - 8.9	6.6 - 8.2

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3355 Test Type&Organism: Acute (*Cyprinodon variegatus*)

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Growth or Reproduction	(NOEC)		(LOEC)	
Normal Distribution (yes/no)				
Homogeneous Variance (yes/no)				
Reference Toxicant Test Date		3/31/97		
Result (mg/L)		>40		
QC Range (mg/L)		2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

Mix L. R.R.

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
2/12/97	>100	>100		
2/28/97	Invalid	>100		
3/12/97	>100	>100		
3/20/97	>100	>100		
3/26/97	>100	>100		

PWC# 680

REED & ASSOCIATES

Toxicity Test Sample Chain of Custody
(Please complete all information)

Facility ODU

Address Dept. Civil & Environ. Eng. ODU.
Norfolk. VA - 23508

County _____ Pipe/Outfall/Location _____

NPDES# _____ Instream Waste Conc _____

Sample collected by (print&sign) yang Affiliation _____

Type of sample ✓ (Grab): Date 03/25/97 Time 1:00 PM

_____ (Composite): From Date _____ Time _____

To Date _____ Time _____

Subsamples comprising composite:

Number Mix. L. RR Frequency of collection _____ Volume 2L.

*Temperature of sample in sample collection device 24.0°C

Final temperature of effluent at sample collection point _____

*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____

*It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)

Is the sample chlorinated? No. dechlorinated? _____ If so, how? _____

Permit with interim chlorine limit? No. If yes – limit (mg/L) _____

Field pH 7.46 Field Total Residual Chlorine _____

Comments/Sample description Mix L. RR.

Type of test(s) to be performed Acute Toxicity Testing

(Specify organisms) Cyprinodon Variegatus & mysid shrimp

Method of shipment Reed

Print & Sign Names

1. Relinquished by yang Date 03/25/97 Time 1:00 PM
   Received by Keith Crawford Date 3-26-97 Time 11:00
2. Relinquished by Keith Crawford Date 3-26-97 Time 11:10
   Received by Arthur Trueller Date 3/26/97 Time 1125 #680
   See PWC C-O-C

FOR REED LAB USE ONLY

JRA# 97-3355 Arrival Temperature 8.4°C On ice? yes

Color tan Odor earthy Solids none

pH 7.80 DO (mg/L) 8.9 Conductivity (µmhos/cm) 1800 @ 19.1 °C

Salinity (ppt) 1 TRC (mg/L) — Method —

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97-3355

REED & ASSOCIATES

NPDES#: 111A CLIENT: Ocean ODU OUTFALL: Mix L.

ORGANISM SOURCE: ABS JRA BATCH#: C206 HATCH DATE: 3/22/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.25	8.28			~~8~~ 6.6 end	7.7	8.2					20.5	19.5	19.7			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.40	8.25	8.28			7.2	7.5	8.2					20.5	19.5	19.7			20	20
100	B	10	10	10																					
12.5	A	10	10	10			8.38	8.25	8.29			7.3	7.7	8.2					20.5	19.5	19.7			20	20
100	B	10	10	10																					
25	A	10	10	10			8.27	8.24	8.30			7.5	7.6	8.2					20.4	19.5	19.7			20	20
100	B	10	10	10																					
50	A	10	10	10			8.19	8.20	8.29			8.0	7.6	8.2					20.0	19.5	19.7			20	20
100	B	10	10	10																					
100	A	10	10	10			7.98	8.09	8.24			8.9	7.5	8.0					19.1	19.5	19.7			20	20
100	B	10	10	10																					

INIT	DSB	DSB	DSB		
DATE 1997	3/26	3/27	3/28		
TIME	1635	1602	1615		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

cute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3355

REED & ASSOCIATES

NPDES#: N/A CLIENT: Ocean ODU OUTFALL: Mix L

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M454 HATCH DATE: 3/25-26/97 1430-0800

Conc (%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	9 10			8.44	8.28	8.24			6.6	7.8	8.0					20.5	20.1	20.1			20	20
100	B	10	10	10																					
6.25	A	10	10	10			8.40	8.25	8.24			7.2	7.7	7.6					20.5	20.1	20.1			20	20
100	B	10	10	10																					
12.5	A	10	9	9			8.38	8.26	8.25			7.3	7.7	7.6					20.5	20.1	20.1			20	20
90	B	10	10	9																					
25	A	10	10	10			8.27	8.24	8.26			7.5	7.7	7.6					20.4	20.1	20.1			20	20
100	B	10	10	10																					
50	A	10	10	10			8.19	8.20	8.27			8.0	7.8	7.7					20.0	20.1	20.1			20	20
100	B	10	10	10																					
100	A	10	10	10			7.98	8.10	8.24			8.9	7.6	7.7					19.1	20.1	20.1			20	20
100	B	10	10	10																					
INIT		DSJ	DSJ	DSJ																					
DATE 1997		3/26	3/27	3/28																					
TIME		1630	1636	1602																					

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

JRA# 97-3355

GENERAL COMMENTS

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODU OUTFALL: Mix L

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/26/97	0	3/25/97 1300	3/26/97	19.1	7.98	/	8.9	/	1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings (Mysid)

Date	Date	Date	1997 Date	3/26	3/27	3/27	3/28				
Method	Method	Method	Time	1700	0950	1700	1020				
Minutes	Amount	Amount	Init	DSB	LDG	LDG	LDG				

DILUENT (20ppt Forty Fathoms 20ppt Hawaiian Marine Mix Other _____) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/26/97	0	3/26/97	205	544	6.6	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	0	Dilute to 1000
6.25	↓	↓	62.5	↓
12.5			125	
25			250	
50			500	
100			1000	0

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250ml TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	@DSB ~~E~~ ~~E~~G @DSB
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	@DSB ~~Baxter~~ VWR	digi-thermo	@DSB ~~1046203~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96

April 3, 1997

Oceana - Old Dominion University

Contract No.: N00187-93-D-9748
Delivery Order: 0228-084
J.O. #: 1912290
Item No.: 0002BH, 0002BJ, 0003AD
NPDES Permit #: N/A
PWC #: 685
Sample ID: DI Water
JRA ID: 97-3357

Performed for:

Merrill Anderson-Ashcraft
Navy Public Works Center
9742 Maryland Avenue
Code 930, Bldg. Z-140
Norfolk, VA 23511

Performed by:

James R. Reed & Associates
11864 Canon Blvd., Suite 103
Newport News, VA 23606

Respectfully,

Beverly E. Blanchard

Carol Isenhour
Vice President

JRA/jsc

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: DI Water JRA #: 97-3357

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:30
Test End:	3/28/97	16:35

Test Type (chronic/acute): Acute

Test Organism: *Mysidopsis bahia* Age: 1 day

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.31 - 8.37	8.24 - 8.44
	Adjusted	N/A	

JRA #: 97-3357 Test Type&Organism: Acute *Mysidopsis bahia* Screen

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.4 - 9.0	6.6 - 8.0

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3357 Test Type&Organism: Acute *Mysidopsis bahia*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/26/97		
	Result (mg/L)	0.09		
	QC Range (mg/L)	0.04	thru	0.24

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

TEST SUMMARY SHEET
(For Marine and Freshwater Tests)

Facility: Oceana - ODU NPDES Permit #: N/A

Outfall/Receiving Stream: DI Water JRA #: 97-3357

Test Period for Which Data is Being Submitted: _____
(i.e., first quarter, semiannual, or annual)

SUMMARY OF TEST CONDITIONS

	Date	Time
Test Start:	3/26/97	16:35
Test End:	3/28/97	16:35

Test Type (chronic/acute): Acute

Test Organism: *Cyprinodon variegatus* Age: 4 days

Test Chamber Size: 250 mL

Volume of Test Solution per Chamber: 200 mL

Diluent: 20 ppt Forty Fathoms

Aeration Period (if necessary): None

RANGE OF CHEMICAL PARAMETERS

Parameter		Effluent	Diluent
1. Chlorine (mg/L)	Initial	N/A	<0.01
	Adjusted	N/A	
2. Salinity (ppt)	Initial	1	20
	Adjusted	20	
3. pH	Initial	8.29 - 8.37	8.25 - 8.44
	Adjusted	N/A	

JRA #: 97-3357 Test Type&Organism: Acute *Cyprinodon variegatus*

RANGE OF CHEMICAL PARAMETERS (Continued):

Parameter	Effluent	Diluent
4. Alkalinity (mg/L as $CaCO_3$)	N/A	N/A
5. Ammonia (mg/L)	N/A	N/A
6. Hardness (mg/L as $CaCO_3$)	N/A	N/A
7. Conductivity (µmhos/cm)	N/A	N/A
8. DO (mg/L)	7.5 - 9.0	6.6 - 8.2

9. Methods Used for Adjustment of Test Solutions

Chlorine N/A
Salinity Forty Fathoms
pH N/A

TEST RESULTS

1. Test Acceptability

Control Survival (%) 100

Average Weight per Control Organism (mg) N/A

Average Number of Young per Control (*C. dubia*) N/A

60% of Control Females (*C. dubia*) with 3 Broods? N/A

Total Number of Male *C. dubia* in the Test N/A
Known Parentage? N/A

Percent Females Producing Eggs (*M. bahia*) N/A

2. Method(s) of Statistical Analyses

Survival: N/A
Growth/Reproduction: N/A

JRA #: 97-3357 Test Type&Organism: Acute *Cyprinodon variegatus*

TEST RESULTS (Continued)

3. Statistical Results (as appropriate)

LC50		>100%		
Survival	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Growth or Reproduction	(NOEC)		(LOEC)	
	Normal Distribution (yes/no)			
	Homogeneous Variance (yes/no)			
Reference Toxicant Test Date		3/31/97		
	Result (mg/L)	>40		
	QC Range (mg/L)	2	thru	36

4. Equipment

	(Make	Model	Serial #	Probe #)
pH meter	Corning	245	5147	G
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	VWR	digi-thermo	7A5 QC1	N/A
Chlorine	Fischer & Porter	821A009423	8811A940230-1	A

5. Protocol Deviations/Comments

CUMULATIVE DATA SUMMARY

NPDES Permit #: N/A

Oceana - ODU

DI Water

Date of Test	Invertebrate LC50 %	Vertebrate LC50 %	Invertebrate NOEC %	Vertebrate NOEC %
3/26/97	>100	>100		

PWC #~~682~~ 695

REED & ASSOCIATES

Toxicity Test Sample Chain of Custody
(Please complete all information)

Facility ODU

Address Dept. Civil & Environ. Eng. ODU.
Norfolk. VA 23508.

County _____ Pipe/Outfall/Location _____

NPDES# _____ Instream Waste Conc _____

Sample collected by (print&sign) yang Affiliation _____

Type of sample ✓ (Grab): Date 03/25/97 Time 9:00PM

_____ (Composite): From Date _____ Time _____

To Date _____ Time _____

Subsamples comprising composite:

Number DI water Frequency of collection _____ Volume 2L.

*Temperature of sample in sample collection device 25.0°C.

Final temperature of effluent at sample collection point _____

*Is sample collection device chilled? _____ Is sample packed on ice for shipment? _____

***It is required that all samples remain at 0 – 4°C during collection period and shipment for data to be accepted by the appropriate Regulatory Agency (Do not freeze!)**

Is the sample chlorinated? No. dechlorinated? _____ If so, how? _____

Permit with interim chlorine limit? No. If yes – limit (mg/L) _____

Field pH 5.46 Field Total Residual Chlorine _____

Comments/Sample description DI water

Type of test(s) to be performed Acute Toxicity Testing

(Specify organisms) cyprinodon Variegatus & Mysid Shrimp

Method of shipment Reed

Print & Sign Names

1. Relinquished by yang Date 03/25/97 Time 9:00PM.
   Received by Keith Cutfield Date 3-26-97 Time 11:00 A.M.
2. Relinquished by Keith Cutfield. Date 3-26-97 Time 11:10 A.M.
   Received by Archie Miller Date 3/26/97 Time 11:50 #625

see PWC COC

FOR REED LAB USE ONLY

JRA# 97-3357 Arrival Temperature 2.4°C On ice? yes

Color Clear Odor none Solids none

pH 5.08 DO (mg/L) 9.0 Conductivity (µmhos/cm) <10 @19.4 °C

Salinity (ppt) <1 TRC (mg/L) — Method —

Acute *Cyprinodon variegatus* Toxicity Test

OBSERVATIONS

JRA# 97,3357

NPDES#: N/A CLIENT: Oceana ODM OUTFALL: DI water

ORGANISM SOURCE: ABS JRA BATCH#: C206 HATCH DATE: 3/22/97

Conc. % / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%)					pH (Day 0: 6.0 - 9.0)					DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C)							TEMPERATURE (19 - 21°C)					SALINITY (19 - 21ppt)	
HOURS⇒		0	24	48			0	24	48			0	24	48					0	24	48			0	END
0	A	10	10	10			8.44	8.25	8.28			6.6	7.7	8.2					20.5	19.5	19.7			20	20
100	B	10	10	10																					
100	A	10	10	10			8.37	8.29	8.34			9.0	7.5	8.0					19.4	19.5	19.7			20	20
100	B	10	10	10																					

INIT		DB	DB	DB	
DATE 19 97		3/24	3/27	3/28	
TIME		1635	1702	1635	

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test

OBSERVATIONS

JRA# 97-3357

REED & ASSOCIATES

NPDES#: N/A CLIENT: Ocean ODU OUTFALL: DI WATER

ORGANISM SOURCE: Chesapeake Cultures JRA BATCH#: M454 HATCH DATE: 3/25-26/97 1430-0800

Conc.(%) / %Surv.	REP ⇓	NUMBER OF LIVE ORGANISMS (Control ≥ 90%) 0	24	48			pH (Day 0: 6.0 - 9.0) 0	24	48			DISSOLVED OXYGEN (mg/L) (>4.0, <9.1 @ 20°C) 0	24	48					TEMPERATURE (19 - 21°C) 0	24	48			SALINITY (19 - 21ppt) 0	END
HOURS⇒																									
0	A	10	10	10			8.44	8.28	8.24			6.6	7.8	8.0					20.5	20.1	20.1			20	20
100	B	10	10	10																					
100	A	10	10	10			8.37	8.31	8.31			9.0	7.7	7.4					19.4	20.1	20.1			20	20
100	B	10	10	10																					

INIT	DBS	DBS	DBS		
DATE 1997	3/26	3/27	3/28		
TIME	1430	1203	1635		

(Indicate comments with an * and document on General Comments page)

Rev 3/19/96

Acute *Mysidopsis bahia* Toxicity Test
" C. variegatus " "

GENERAL COMMENTS

JRA# 97-3357

REED & ASSOCIATES

NPDES#: N/A CLIENT: Oceana ODM OUTFALL: DI water

SAMPLE (PRIOR TO ADDITION OF ORGANISMS)

DATE	DAY	COLLECT DATE/TIME	ARRIVAL DATE	TEMP (°C) 19-21	INIT pH	FINAL pH 6-9	INIT DO (mg/L)	FINAL DO (mg/L) >4;<9.1	INIT SAL (ppt)	FINAL SAL (ppt) 19-21	INIT TRC (mg/L)	FINAL TRC (mg/L)
3/26/97	0	3/25/97 2100	3/26/97	19.4	8.37	/	9.0	/	<1	20	/	/

DO Adj. pH Adj. TRC Adj. Feedings Mys.d

Date				1997 Date	3/26	3/27	3/27	3/28	~~3/28~~ ~~3/29~~ (DSB) ~~3/29~~ ~~3/30~~
Method				Time	1700	0950	1700	1020	1
Minutes	Amount	Amount		Init	DSB	LDG	LDG	LDG	

DILUENT (~~20ppt Forty Fathoms~~ 20ppt Hawaiian Marine Mix Other) CIRCLE ONE

DATE	DAY	DATE MADE	TEMP (°C) 19-21	pH 6-9	DO (mg/L) >4;<9.1	SAL (ppt) 19-21	TRC (mg/L) <0.01
3/26/97	0	3/26/97	20.5	8.44	6.6	20	<0.01

TREATMENT PREPARATIONS CALCULATIONS

CONC (% mg/L) (circle one)	TOTAL VOLUME (mL)	STOCK CONC (% mg/l)	AMOUNT STOCK (mL)	AMOUNT DILUENT (mL)
Control	1000	100	—	1000
100	1000	100	1000	—

CALCULATIONS PERFORMED BY: DSB

VERIFICATION OF:	VERIFIED BY:
TREATMENT PREPARATION CALCULATIONS	DSB
NUMBER OF ORGANISMS	DSB
STATISTICAL ANALYSES	N/A

ANALYST SIGNATURES	INITIALS
[signature]	DSB

TEST CHAMBER SIZE: 250mL TYPE: polystyrene VOLUME OF TEST SOLUTION: 200mL

EQUIPMENT	Make	Model	Serial Number	Probe Number
pH meter	Corning	245	5147	(DSB) RG (DSB)
DO meter	YSI	54ARC	14522	N
SCT meter	YSI	33	4458	A
Temperature	(DSB) ~~Fisher~~ VWR	digi-thermo	(DSB) ~~1016303~~ 7A5 QC1	n/a
Chlorine	Fischer & Porter	821A009U23	8811A940230-1	A

COMMENTS:

Rev 3/19/96